British Medical Association.

REPORT

OF

The Committee on Treatment of Simple Fractures.

CONCLUSIONS.

The following are the main Conclusions deduced from an analysis and full consideration by the Committee of the material collected by the Committee's Investigators :—

I. The statistics relative to the non-operative treatment of fractures of the shafts of the long bones in children (under the age of 15 years), with the exception of fractures of both bones of the forearm, show as a rule a high percentage of good results. These are unlikely to be improved upon materially by any other method of treatment. Operative results in children, expressed in percentages, are approximately the same as the non-operative. The relative figures are :—

Non-Operative Cases (Cases, 1,017) 90·5% good functional results (*See* Table V., page 1526.)

Operative Cases (Cases, 64) 93·6 % good functional results. (*See* Table V., page 1526.)

II. It is possible either by non-operative or by operative treatment to obtain a high percentage of good results in children.

III. In comparison with the non-operative results in children, the aggregate results of non-operative treatment in those past childhood (*i.e.*, over the age of 15 years) are not satisfactory. (*See* Table V., page 1526.)

IV. From the analysis of the age groups it is clear that there is a progressive depreciation of the functional result of non-operative treatment as age advances, that is to say, the older the patient the worse the result. (*See* Table VI., page 1526.)

V. In cases treated by immediate operation, the deleterious influence of age upon the functional result is less marked.

VI. In nearly all age groups, operative cases show a higher percentage of good results than non-operative cases (*See* Table I., page 1508.)

VII. Although the functional result may be good with an indifferent anatomical result, the most certain way to obtain a good functional result is to secure a good anatomical result. (*See* 1st paragraph, page 1525.)

VIII. No method, whether non-operative or operative, which does not definitely promise a good anatomical result, should be accepted as the method of choice. For this reason mobilisation and massage by themselves have not been found to secure a high percentage of good results. They are, however, valuable supplementary methods of treatment.

Similarly, of operative methods, those which secure reposition and absolute fixation of the fragments yield better results than methods which fall short of this; imperfect fixation of the fragments by wire or other suture has been found to be an unsatisfactory procedure in the treatment of fractures of the long bones, with the exception of the olecranon process of the ulna.

IX. Operative treatment should not be regarded as a method to be employed in consequence of the failure of non-operative measures, as the results of secondary operations (Classes B and C) compare very unfavourably with those of immediate operations (Class A). (*See* Table IV., page 1525.)

In order to secure the most satisfactory results from operative treatment, it should be resorted to as soon after the accident as practicable.

X. It is necessary to insist that the operative treatment of fractures requires special skill and experience, and such facilities and surroundings as will ensure asepsis. It is, therefore, not a method to be undertaken except by those who have constant practice and experience in such surgical procedures.

XI. A considerable proportion of the failures of operative treatment are due to infection of the wound, a possibility which may occur even with the best technique.

XII. The mortality directly due to the operative treatment of simple fractures of the long bones has been found to be so small that it cannot be urged as a sufficient reason against operative treatment. (*See* Table X., page 1528.)

XIII. For surgeons and practitioners who are unable to avail themselves of the operative method, the non-operative procedures are likely to remain for some time yet the more safe and serviceable.

INTRODUCTION.

The Fractures Committee, in presenting the Report on its investigation into the treatment of fractures pursuant to the instructions of the Council, desires to record its sense of obligation and thanks to all surgeons and surgical registrars who have so cordially granted facilities for the examination of patients and also to those who by clerical and other assistance have rendered the inquiry less onerous than it otherwise would have been.

The number of cases (over 2,900) on which the Report is based, and the wide geographical distribution of the centres of investigation, afford evidence that the results of all variations in treatment have been under review.

The analyses and deductions in respect of the non-operative cases are specially valuable, presenting, as they do, questions of great interest for deliberation.

With regard to operative treatment, it is a matter of regret that a much larger number than 208 have not been available for personal inspection. In this connection the Committee feels that it is unfortunate in being unable to include in the main Report the operative cases so kindly exhibited by Mons. A. Lambotte, of Antwerp, as the figures were made up and in type before the analysis of these additional cases could be completed. They are, however, analysed and appended to the *précis* on technique which Mons. Lambotte has been good enough to furnish and for which sincere thanks are due.

Mr. W. Arbuthnot Lane has also placed the Committee under a great obligation by acceding very cordially to a request for an account of his operative method.

The Committee very gratefully acknowledges its debt of gratitude to Mons. Just Lucas-Championnière for demonstrating a large number of radiographs and some cases, and for presenting a synopsis of his method for inclusion in this Report.

To Dr. F. Steinmann, of Bern, the Committee offers a warm recognition of his courtesy in supplying so generously an exposition of a procedure which is original and interesting.

The sincere thanks of the Committee are also offered to Prof. B. Bardenheuer, of Cologne, for a valuable set of volumes and papers illustrative of his extension method of treatment. Extracts from these will be found in the Appendix to the Report.

The Committee desires to mark their appreciation of the valuable services rendered by Sister May Sinzininex, who has with great care and accuracy analysed and tabulated the material embodied in the Report.

The thanks of the Committee and Association are due to Dr. A. D. Macpherson, Assistant Medical Secretary, and the office staff, for their untiring efforts on behalf of the enquiry. It would be impossible to name individually all others who have assisted, but it is hoped that they will accept this record of the grateful thanks of the Committee.

PART I.—PRELIMINARY CONSIDERATIONS.

The Committee was appointed by the Council of the British Medical Association in response to a recommendation to that effect by the Section of Surgery at the Annual Meeting of the Association held in July, 1910. The reference from the Council to the Committee was—

"To report on the ultimate results obtained in the treatment of simple fractures with or without operation."

The following are the members of the Committee:—Mr. W. J. Greer, Newport, Mon., *Chairman;* Mr. J. Grant Andrew, Glasgow; Mr. Charles W. Cathcart, Edinburgh; Mr. H. S. Clogg, London; Mr. Edward Deanesly, Wolverhampton; Mr. C. H. Fagge, London; Sir Victor Horsley, F.R.S., London; Prof. J. Rutherford Morison, Newcastle-on-Tyne; Mr. Herbert J. Paterson, London; Mr. P. W. G. Sargent, London; Mr. W. Taylor, Dublin; Mr. Wilfrid Trotter, London; Mr. Richard Warren, London: with the following *ex-officio*:—Prof. Robert Saundby, M.D., Birmingham, *President of the Association;* Dr. Ewen J. Maclean, Cardiff, *Chairman of Representative Meetings;* Dr. J. A. Macdonald, LL.D., Taunton, *Chairman of Council;* Dr. Edwin Rayner, Stockport, *Treasurer.*

The Committee was appointed in February, 1911, and held its first meeting in March, 1911.

The Committee decided to limit the inquiry to simple fractures of the long bones which occurred, or in which operations had been performed, in the period January, 1906, to December, 1910, inclusive. This period was chosen in order that no patient should be examined until at least six months had elapsed since the commencement of treatment.

A notice as to the formation of the Committee and its reference was published in the BRITISH MEDICAL JOURNAL and *Lancet* of April 8th, 1911, with a request to hospital surgeons and other practitioners interested kindly to communicate with the Committee if they could afford facilities for the examination of cases.

Subsequently the surgeons on the staffs of the general hospitals in the following towns were approached, through the respective surgical registrars, and asked to assist in the inquiry by affording access to their case books with a view to the examination of their patients and records by members of the Committee:—Birmingham, Bristol, Dublin, Edinburgh, Glasgow, Leeds, Leicester, Liverpool, London, Manchester, Newcastle, and Sheffield.

Investigations were conducted at the following hospitals, the number of patients (or records of cases, in the case of patients deceased) examined at each hospital being indicated in brackets:—Birmingham—General Hospital (116); Bristol—General Hospital (101), Royal Infirmary (151); Dublin—Adelaide Hospital (4), Dr. Steevens' Hospital (31) Mercers' Hospital (7): Edinburgh—Royal Infirmary (131); Glasgow—Victoria Infirmary (100); Leeds—General Infirmary (324); London—Charing Cross Hospital (54), Guy's Hospital (423), Great Ormond Street Hospital (32); London Hospital (358); Metropolitan Hospital (20), St George's Hospital (133), St. Thomas's Hospital (323); University College Hospital (28); Newcastle-on-Tyne—Royal Victoria Infirmary (50); Sheffield—Royal Infirmary (225).

METHOD OF INVESTIGATION.

The hospitals indicated were visited on certain days by two or more members of the Committee (referred to in this Report as "investigators.") Every patient whose case forms a part of the Report was seen and examined by a member of the Committee. The details of the cases were filled in on the inquiry form, a copy of which is appended. (See Appendix A.)

It is obvious that some allowance must be made for individual variation of judgment of the investigators as to the verdict on each patient, but after frequent discussions on the subject the Committee is of opinion that fair uniformity of standard has been secured. With regard to the terms good, moderate, bad, used by the investigators, the one to which the most precise significance can be attached is that in which a case is noted as having a good anatomical and a good functional result. This may be taken to imply that such result was perfect, or nearly so.

In no instance is the report of a case that of the surgeon who treated the patient.

The importance of guarding against the cases being in any way selected, either accidentally or otherwise, was kept before the Committee. All the patients who attended were examined and reported upon, if adequate information were available. Certain circumstances, however, tended to lead to the cases available for report at any given institution not being absolutely representative of the whole results of the institution. For example the necessary fixing of definite times of attendance caused the numbers available to include an excessive proportion of children, and so influences the results favourably. Again, the same circumstance led to the attendance of an undue proportion of adults more or less incapacitated or out of work. This would tend to influence the total results unfavourably. The cases reported on at Newcastle-on-Tyne were representative in an exceptional degree, as the visit of the investigators coincided with the coal strike, so that a large number of men normally in full work were able to attend. Taking these circumstances together, the Committee is of opinion that no serious fallacy is involved in utilising the results as recorded.

1. MATERIAL.—Exclusive of cases investigated abroad, 2,948 patients attended for examination, making, together with the cases fatal during treatment, a total of 3,062 cases investigated in the United Kingdom. The inquiry forms relating to 122 of these were rejected by the Committee on account of insufficient details or because they did not come within the definition as to time limit or variety laid down by the Committee. A return was obtained from each hospital giving the total number of cases coming under the reference and treated during the period under review, the forms containing also details of all fatal cases occurring during the period. The Report is based on 2,940 cases personally investigated.

The following are the numbers of fractures of the different bones examined:—Femur, 897; tibia, 485; fibula, 274; tibia and fibula, 831; humerus, 302; ulna, 80; radius, 123; ulna and radius, 109.

2. Definition of Terms and Methods of Analysis.

(i.) Operative treatment is defined as including any operation in which the seat of fracture is exposed with a view to reposition of the fragments.

(ii.) Three classes of cases are distinguished under operative treatment, namely:—

(a) Those cases in which operation is decided upon at once and is performed as soon as practicable. **(Class A.)**

(b) Those cases in which operation is performed on account of failure to obtain and maintain accurate apposition by means of external mechanical appliances. **(Class B.)**

(c) Those cases in which operation is performed for non-union, for deficient union, or for faulty union, whether in progress or complete. **(Class C.)**

Classes B. and C. consist of cases in which, in the judgment of the surgeon, non-operative treatment has failed, such failure being the reason for operation. It seems to the Committee that in these cases the opinion of the surgeon in charge should be accepted as a sound judgment upon the unsatisfactory nature of the primary non-operative treatment. These cases, then, are clearly failures of non-operative treatment. The Committee, however, has deemed it undesirable to include them under the non-operative cases, as the non-operative result was not seen by the investigator. As a matter of fact the number of such cases is so small that the inclusion of them would, as has been proved by calculation, have merely a fractional influence on the percentages. For these reasons classes B. and C. have been kept separate, and are available for comparison with the A. group of operative cases.

(iii.) It is deemed undesirable to include under the general head of operative treatment of fractures subsidiary operations such as are not covered by the definition contained in Paragraph (i.). This will apply to such treatment as:—(a) Tenotomies, (b) Osteotomies, (c) Excision of Joints, (d) Removal of callus or of projecting fragments, (e) Freeing of nerves. Cases in which a subsidiary operation has been performed are necessarily included in the non-operative material.

It is with Class A only, in the judgment of the Committee, that the results in non-operative cases should be compared.

3. Non-Operative Treatment.—Two types of non-operative treatment are generally recognised, namely:—

(a) In which fixation is adopted immediately, and is continued until union has taken place.

(b) In which mobilisation is adopted.

Massage may be practised in combination with either of these methods.

It was hoped to draw a sharp distinction between those cases in which massage had been one of the chief lines of treatment from the beginning, and those in which massage had been practised as subsidiary to other treatment; but the material was so small, and exact details so deficient, that the Committee had to relinquish this design.

4. The Committee was of opinion that as a supplementary inquiry an effort might be made to show the influence on the ultimate result of primary replacement of the fragments by manipulation under an anæsthetic, when controlled by X-ray evidence. This was found to be impracticable.

Classification according to the exact form of the fracture was not possible, owing to the paucity of detail, and it was not practicable to obtain any valuable information as to the correlation of the occupation of the patient with the degree of success which attended the treatment.

5. The non-operative and operative material is analysed on exactly parallel lines.

The Committee wishes to point out that the operative material available within the years selected is so small that it is undesirable to attempt to draw any final conclusion from this material, as to the relative value of operative and non-operative treatment. The results are given in comparable form for what they are worth, but the Committee wishes emphatically to state its opinion that the chief value of its Report lies in the data collected and analysed as to the result of non-operative treatment.

It may be pointed out that the collection of facts relating to the non-operative treatment of fractures is a very large one, and such as yields conclusions which have a considerable degree of finality. Thus, at any time in the future, further results of operative treatment could be analysed on the same basis and compared with them, and the relative value of the methods finally ascertained.

6. The primary headings under which the material is analysed are the individual fractures as indicated below, not the individual bones.

7. Conclusions as to the efficiency of treatment can be deduced only from:—

(i.) The diagram of the result (see page 1 of the inquiry form printed in Appendix (A)) filled in by the Investigator.

(ii.) Duration of absence from work.

8. It is obvious that (i.) embodies the chief material, and represents the considered judgment of the investigator (in doubtful cases of two investigators), formed as a result of his personal examination of the patient. In this judgment the wage earning capacity of the patient has been taken into account. The duration of the patient's incapacity to follow his or her usual occupation has, on the other hand, a certain independent value, and must therefore be considered separately. It must be recognised, however, that this period is not solely dependent upon the nature of the injury or the treatment adopted, but varies greatly with the temperament of the patient, the nature of his employment, and the attitude of the employer and of the employee as to compensation.

Unfortunately, the details as to the period of incapacitation are available only in a small proportion of the cases. The result of this is that while the non-operative material is sufficiently large to yield a fairly reliable numerical value for the average length of convalescence—the operative is so small that no corresponding figure of any value can be obtained. Of the various ways in which the results—as to the length of incapacitation—might be stated, the Committee has thought it desirable to give two, namely:—

(a) The average time of absence from work in those cases in which a good functional result had been obtained at the time at the Committee's examination.

(b) The percentage of cases of any given fractures in which permanent incapacitation was the result of the injury. (See Tables VII. and VIII. pages 1526-27.)

9. For each separate variety of fracture stated below a sheet has been drawn up, separate sheets for non-operative and operative treatment, for male and female patients, and for every age sub-division. (See Appendix (B).)

10. The Committee adopted the following Sub-Division of Fractures:—

Schedule of Fractures.

(I.)—*Femur.*

(a) Fractures of neck.
(b) Separated epiphysis of head (with or without fracture)
(c) Fracture of upper third of shaft.
(d) Fracture of middle of shaft.
(e) Fracture of lower third of shaft.
(f) Fracture of lower extremity involving knee joint.
(g) Separated lower epiphysis (with or without fracture).

(II.)—*Tibia.*

(a) Separated upper epiphysis (with or without fracture).
(b) Fracture of shaft.
(c) Separated lower epiphysis (with or without fracture).
(d) Internal malleolus.

(III.)—*Fibula.*

(a) Separated upper epiphysis (with or without fracture).
(b) Fracture of shaft.
(c) Separated lower epiphysis (with or without fracture).

(IV.)—*Tibia and Fibula.*

(a) Fracture of shafts of both bones.
(b) Pott's fracture.

(V.)—*Humerus.*

(a) Anatomical neck.
(b) Separated upper epiphysis (with or without fracture).
(c) Fracture of tuberosity.
(d) Fracture of surgical neck.
(e) Fracture of shaft.
(f) Supra of condylic fracture.
(g) Separated lower epiphysis (with or without fracture).
(h) Internal condyle; external condyle, capitellum.

(VI.)—*Radius.*

(a) Separated upper epiphysis (with or without fracture).
(b) Fracture of shaft.
(c) Separated lower epiphysis (with or without fracture).

VII.—*Ulna.*

(a) Fracture of olecranon.
(b) Fracture of shaft.
(c) Separated lower epiphysis (with or without fracture).

(VIII.)—*Radius and Ulna.*

(a) Fracture of shafts of both bones.
(b) Colles's Fracture.

Age Groups.

11. The Committee considered it to be of great importance to ascertain the influence of age on fractures treated on similar lines and accordingly adopted a detailed sub-division of age groups as follows:—

(a) 0 to 10 years.
(b) 11 to 15 ,,
(c) 16 to 20 ,,
(d) 21 to 25 ,,
(e) 26 to 45 ,,
(f) 46 to 60 ,,
(g) 61 years and over.

PART II.—ANALYSIS OF MATERIAL.

1. ABSTRACTS OF INQUIRY FORMS FOR EACH FRACTURE.

In Table I. are given the results of the treatment of the various fractures arranged in age groups. The totals for each age group, and in addition the totals for I. Non-Operative cases, and II. Immediate Operative cases (Class A) are given.

The totals for the B and C operative classes are given separately.

After the operative cases, the number of cases in which a subsidiary operation was performed is indicated.

In the percentages given at the end of each group of non-operative cases, subsidiary operations are included, in accordance with the decision of the Committee set out in paragraph 2 (iii) of the Report. The percentages, therefore, in the two columns referring to the non-operative cases indicate (1) The percentage of non-operative cases (including subsidiary operations) in which the anatomical and the functional result was good, (2) The percentage of cases in which the functional result was good, but the anatomical result moderate or bad. The two percentages added together give the total percentage in which a good functional result was obtained irrespective of the anatomical result.

TABLE I.

ABSTRACTS OF ENQUIRY FORMS.

Fracture.	Age Group (Years).	No. of Cases.	Anatomical Result.			Functional Result.			Percent. of Good Anat. and Good Funct.	Percent. of Mod. or Bad Anat. with Good Funct.
			Good	Mod.	Bad	Good	Mod.	Bad		
I. (a) Femur—Neck.										
I. Non-Operative	0-10 M.	3	3	—	—	3	—	—		
	11-15 M.	1	—	1	—	1	—	—		
	16-20 M.	1	—	1	—	1	—	—		
	26-45 M.	14	4	7	3	5	4	5		
	26-45 F.	6	—	3	3	1	1	4		
		20	4	10	6	6	5	9		
	46-60 M.	20	4	10	6	5	7	8		
	46-60 F.	10	3	2	5	3	3	4		
		30	7	12	11	8	10	12		
	61 M.	15	1	7	7	2	5	8		
	61 F.	21	3	8	10	3	8	10		
		36	4	15	17	5	13	18		
Total	(M. & F.)	91	18	39	34	24	28	39	16·4 %	9·8 %
II. Operative A.	0-10 M.	1	1	—	—	1	—	—	100 %	
B.	46-60 F.	1	1	—	—	—	1	—		
I. (b) Femur—Separated Epiphysis of Head.										
I. Non-Operative	11-15 M.	4	2	2	—	3	1	—		
	11-15 F.	1	1			1				
		5	3	2	—	4	1	—		
	16-20 M.	4	1	2	1	2	—	2		
Total	(M. & F.)	9	4	4	1	6	1	2	44·4 %	22·2 %
I. (c). Femur—Upper third of Shaft.										
I. Non-Operative.	0-10 M.	27	25	1	1	27	—	—		
	0-10 F.	15	12	2	1	13	2	—		
		42	37	3	2	40	2	0		
	11-15 M.	3	3	—	—	3	—	—		
	11-15 F.	2	1	1	—	2	—	—		
		5	4	1	—	5	—	—		
	16-20 M.	5	2	3	—	4	1	—		
	21-25 M.	2	2	—	—	2	—	—		
	26-45 M.	9	2	2	5	6	1	2		
	26-45 F.	4	1	2	1	2	1	1		
		13	3	4	6	8	2	3		
	46-60 M.	17	4	6	7	6	6	5		
	46-60 F.	4	—	2	2	2	—	2		
		21	4	8	9	8	6	7		
	61 M.	4	1	1	2	1	0	3		
	61 F.	4	—	3	1	—	4	—		
		8	1	4	3	1	4	3		
Total	(M. & F.)	96	53	23	20	68	15	13	54·1%	4·2 %
B.	—	1	1	—	—	1	—	—		
C.	—	7	—	2	5	2	—	5		
Total	(M. & F.)	104	54	25	25	71	15	18	50·9%	

Fracture.	Age Group (Years).	No. of Cases.	Anatomical Result.			Functional Result.			Percent. of Good Anat. and Good Funct.	Percent. of Mod. or Bad Anat. with Good Funct.
			Good	Mod.	Bad	Good	Mod.	Bad		
I. (c). Femur—Upper third of Shaft. *—continued.*										
II. Operative A.	0-10 M.	2	2	—	—	2	—	—		
	11-15 M.	1	1	—	—	1	—	—		
Total	(M. & F.)	3	3	—	—	3	—	—	100%	
B.	11-15 F.	1	1	—	—	1	—	—		
C.	11-15 M.	1	—	1	—	1	—	—		
	16-20 M.	1	—	1	—	1	—	—		
	26-45 F.	1	—	—	1	—	—	1		
	46-60 M.	4	—	—	4	—	—	4		
Total C.	(M. & F.)	7	—	2	5	2	—	5		
I. (d) Femur—Middle third of Shaft.										
I. Non-Operative	0-10 M.	216	198	16	2	211	5	—		
	0-10 F.	49	44	5	0	42	5	2		
		265	242	21	2	253	10	2		
	11-15 M.	57	41	13	3	53	4	—		
	11-15 F	6	4	1	1	5	—	1		
		63	45	14	4	58	4	1		
	16-20 M.	27	3	17	7	19	6	2		
	16-20 F.	2	2	—	—	2	—	—		
		29	5	17	7	21	6	2		
	21-25 M.	7	1	3	3	4	2	1		
	21-25 F.		—	—	—	—	—	—		
		7	1	3	3	4	2	1		
	26-45 M.	29	7	13	9	13	12	4		
	26-45 F.	3	2	1	—	2	1	—		
		32	9	14	9	15	13	4		
	46-60 M.	25	2	9	7	11	8	6		
	46 60 F.	5	—	3	2	—	—	5		
		30	9	12	9	11	8	11		
	61-M.	9	2	3	4	2	5	2		
	61-F.	1	1	—	—	—	1	—		
		10	3	3	4	2	6	2		
Total	(M.&F.)	436	314	84	38	364	49	23	67·8 %	13·2 %
B.		10	6	3	1	6	2	2		
C.		9	4	2	3	7	—	2		
Subsidiary		2	—	—	2	—	—	2		
		457	324	89	44	377	51	29	67·1 %	
II. Operative— A.	0-10 M.	17	16	1	—	16	1	—		
	0-10 F.	5	5	—	—	5	—	—		
		22	21	1	—	21	1	—		
	11-15 M.	3	3	—	—	3	—	—		
	16 20 M.	1	1	—	—	1	—	—		
	16 20 F.	1	—	1	—	—	1	—		
		2	1	1	—	1	1	—		
Total	(M.& F.)	27	25	2	—	25	2	—	92·5 %	

Fracture.	Age Group (Years).	No. of Cases.	Anatomical Result.			Functional Result.			Percent. of Good Anat. and Good Funct.	Percent. of Mod. or Bad Anat. with Good Funct.
			Good	Mod.	Bad	Good	Mod.	Bad		
I. (d) Femur—Middle third of Shaft. *—continued.*										
B.	0-10 M.	2	2	—	—	2	—	—		
	0-10 F.	—	—	—	—	—	—	—		
	11-15 M.	3	2	1	—	2	1	—		
	11-15 F.	1	1	—	—	1	—	—		
		4	3	1	—	3	1	—		
	16-20 M.	1	1	—	—	1	—	—		
	16-20 F.	1	—	1	—	—	1	—		
		2	1	1	—	1	1	—		
	26-45 M.	2	—	1	1	—	—	2		
Total	(M. & F.)	10	6	3	1	6	2	2		
C.	0-10 M.	3	3	—	—	3	—	—		
	0-10 F.	1	1	—	—	1	—	—		
		4	4	—	—	4	—	—		
	11-15 M.	2	—	1	1	1	—	1		
	16-20 F.	1	—	1	—	1	—	—		
	26-45 M.	2	—	—	2	1	—	1		
Total	M. & F.	9	4	2	3	7	—	2		
I. (e) Femur—Lower third of Shaft.										
I. Non-Operative	0-10 M.	29	28	1	—	28	1	—		
	0-10 F.	5	5	—	—	5	—	—		
		34	33	1	—	33	1	—		
	11-15 M.	11	7	3	1	10	—	1		
	11-15 F.	5	3	1	1	4	1	—		
		16	10	4	2	14	1	1		
	16-20 M.	9	5	3	1	9	—	—		
	16-20 F.	3	1	2	—	2	1	—		
		12	6	5	1	11	1	—		
	21-25 M.	—	—	—	—	—	—	—		
	21-25 F.	1	—	1	—	1	—	—		
	26-45 M.	1	—	—	1	1	—	—		
	26-45 F.	15	5	6	4	7	6	2		
		16	5	6	5	8	6	2		
	46-60 M.	10	5	2	3	5	5	0		
	46-60 F.	5	2	2	1	2	2	1		
		15	7	4	4	7	7	1		
	61 M.	4	1	1	2	1	1	2		
	61 F.	6	1	2	3	2	2	2		
		10	2	3	5	3	3	4		
Total	M. & F.	104	63	24	17	77	19	8	58·6%	15·3%
B.	—	2	1	1	—	1	1	—		
C.	—	4	1	—	3	1	2	1		
		110	65	25	20	79	22	9	55·4%	
II. Operative— A.	11-15 M.	1	1	—	—	1	—	—		
	16-20 M.	1	—	—	1	—	1	—		
Total	—	2	1	—	1	1	1	—		
B.	0-10 M.	1	—	1	—	1	—	—		
B.	21-25 M.	1	1	—	—	—	1	—		
Total B.	—	2	1	1	—	1	1	—		
C.	11-15 M.	1	1	—	—	—	1	—		
	26-45 M.	1	—	—	1	—	—	1		
	46-60 F.	2	—	—	2	1	1	—		
Total C.	(M. & F.)	4	1	—	3	1	2	1		

Fracture.	Age Group (Years).	No. of Cases.	Anatomical Result.			Functional Result.			Percent. of Good Anat. and Good Funct.	Percent. of Mod. or Bad Anat. with Good Funct.
			Good	Mod.	Bad	Good	Mod.	Bad		
I. (f) Femur—Lower Extremity involving Knee-joint										
I. Non-Operative	0-10 M.	1	1	—	—	1	—	—		
	11-15 M.	1	1	—	—	1	—	—		
	16-20 M.	1	—	1	—	1	—	—		
	21-25 M.	1	—	—	1	—	—	1		
	26-45 M.	3	3	—	—	3	—	—		
	46-60 M.	4	—	1	3	—	3	1		
	61- M.	1	—	—	1	—	—	1		
Total M.	(no F.)	12	5	2	5	6	3	3	41· %	8·3%
B.		4	—	1	3	—	2	2		
C.		2	—	1	1	—	1	1		
		18	5	4	6	6	6	6	27·7 %	
II. Operative—										
A.	26-45	1	—	1	—	—	1	—		
B. ..	26-45 M.	1	—	—	1	—	—	1		
	46-60 F.	2	—	—	2	—	1	1		
Total	M. & F.	3	—	—	3	—	1	2		
C.	26-45 M.	1	—	1	—	—	1	—		
	46-60 M.	1	—	—	1	—	—	1		
Total	M. only	2	—	1	1	—	1	1		
I. (g) Femur—Lower Epiphysis										
I. Non-Operative	0-10 M.	4	4	—	—	4	—	—		
	0-10 F.	1	1	—	—	—	—	1		
		5	5	—	—	4	—	1		
	11-15 M.	3	1	—	2	2	1	—	55·5 %	11·1 %
Total	(M.& F.)	8	6	—	2	6	1	1		
C		1	—	—	1	—	—	1		
Subsidiary ..		1	1	—	—	—	1	—		
		10	7	—	3	6	2	1		
II. (b) Tibia—Shaft.										
I. Non-Operative	0-10 M.	119	114	4	1	117	1	1		
	0-10 F.	45	41	1	3	43	1	1		
		164	155	5	4	160	2	2		
	11-15 M.	47	45	1	1	45	0	2		
	11-15 F.	12	12	—	—	12	—	—		
		59	57	1	1	57	0	2		
	16-20 M.	32	24	6	2	29	1	2		
	16-20 F.	4	2	1	1	1	1	2		
		36	26	7	3	30	2	4		
	21-25 M.	18	14	3	1	16	1	1		
	21-25 F.	3	3	—	—	3	—	—		
		21	17	3	1	19	1	1	..	
	26-45 M.	58	35	21	2	43	11	4	..	
	26-45 F.	14	6	6	2	7	5	2		
		72	41	27	4	50	16	6		
	46 60 M.	46	22	18	6	29	10	7		
	46-60 F.	11	8	2	1	8	3	—		
		57	30	20	7	37	13	7		
	61 M.	8	4	2	2	5	1	2		
	61 F.	7	6	1	—	4	3	—		
		15	10	3	2	9	4	2		
Total	(M.& F.)	424	336	66	22	362	38	24	74·4 %	10·7 %
B.		2	—	1	1	1	1	—		
C.		1	1	—	—	1	—	—		
Subsidiary		2	—	1	1	—	1	1		
		429	337	68	24	364	40	25		

Fracture.	Age Group (Years).	No. of Cases.	Anatomical Result.			Functional Result.			Percent. of Good Anat. and Good Funct.	Percent. of Mod. or Bad Anat. with Good Funct.
			Good	Mod.	Bad	Good	Mod.	Bad		
II. (b) Tibia—Shaft *—continued.*										
II. Operative										
A.	0-10 M.	6	6	—	—	6	—	—		
	11-15 M.	1	1	—	—	1	—	—		
	21 25 M.	1	—	1	—	1	—	—		
	26-45 M.	3	3	—	—	3	—	—		
	26-45 F.	1	1	—	—	1	—	—		
		4	4	—	—	4	—	—		
	46-60 M.	3	2	1	—	2	—	1		
	46-60 F.	1	—	—	1	1	—	—		
		4	2	1	1	3	—	1		
	61 M.	—	—	—	—	—	—	—		
	61 F.	1	—	1	—	1	—	—		
		17	13	3	1	16	—	1	76·4 %	17·6 %
	11-15 M.	1	—	1	—	1	—	—		
	26-45 M.	1	—	—	1	—	1	—		
		2	—	1	1	1	1	—		
C.	26-45 M.	1	1	—	—	1	—	—		
II. (c) & (d) Tibia—Various. Lower Epiphysis.										
I. Non-Operative	0-10 M.	1	1	—	—	1	—	—		
	0-10 F.	1	1	—	—	1	—	—		
		2	2	—	—	2	—	—		
	16-20 M.	1	1	—	—	1	—	—		
Total	(M.& F.)	3	3	—	—	3	—	—	100 %	
Tibia—Internal Malleolus.	26-45 M.	2	1	1	—	1	1	—	50 %	
Fibula—Malleolus.	46-60 F.	1	1	—	—	1	—	—		
	61-F.	1	1	—	—	1				
		2	2	—	—	2	—	—	100 %	
III (b) Fibula—Shaft.										
I. Non-Operative	0-10 M.	5	5	—	—	5	—	—		
	0-10 F.	2	2	—	—	2	—	—		
		7	7	—	—	7	—	—		
	11-15 M.	3	2	—	1	1	2	—		
	11-15 F.	1	1	—	—	1	—	—		
		4	3	—	1	2	2	—		
	16-20 M.	4	4	—	—	4	—	—		
	16-20 F.	1	1	—	—	1	—	—		
		5	5	—	—	5	—	—	..	
	21-25 M.	8	7	1	—	7	1	—	..	
	26-45 M.	56	45	9	2	48	4	4		
	26-45 F.	17	14	2	1	10	5	2		
		73	59	11	3	58	9	6		
	46-60 M.	34	30	2	2	26	4	4		
	46-60 F.	8	6	2	—	2	4	2		
		42	36	4	2	28	8	6		
	61- M.	9	7	2	—	5	1	3		
	61- F.	4	3	—	1	2	1	1		
		13	10	2	1	7	2	4		
Total	(M. & F.)	152	127	18	7	114	22	16	70·5 %	3·9 %
Subsidiary Op. ..	—	1	—	—	1	—	1	—		
		153	127	18	8	114	23	16		
II. Operative—										
A.	26-45 F.	1	1	—	—	1	—	—	100 %	

Fracture.	Age Group (Years).	No. of Cases.	Anatomical Result.			Functional Result.			Percent. of Good Anat. and Good Funct.	Percent. of Mod. or Bad Anat. with Good Funct.
			Good	Mod.	Bad	Good	Mod.	Bad		
IV. (a) Tibia and Fibula—Shafts.										
I. Non-Operative	0-10 M.	61	52	6	3	56	4	1		
	0-10 F.	11	10	1	—	11	—	—		
		72	62	7	3	67	4	1		
	11-15 M.	40	32	5	3	38	1	1		
	11-15 F.	4	4	—	—	4	—	—		
		44	36	5	3	42	1	1		
	16-20 M.	31	22	5	4	26	5	—		
	16-20 F.	2	1	1	—	1	1	—		
		33	23	6	4	27	6	—		
	21-25 M.	23	9	10	4	18	3	2		
	21-25 F.	4	1	2	1	3	1	—		
		27	10	12	5	21	4	2		
	26-45 M.	161	60	64	37	111	36	14		
	26-45 F.	38	12	18	8	20	12	6		
		199	72	82	45	131	48	20		
	46-60 M.	84	30	31	23	58	12	14		
	46-60 F.	47	16	17	14	17	22	8		
		131	46	48	37	75	34	22		
	61- M.	25	7	10	8	14	9	2		
	61- F.	17	7	5	5	7	8	2		
		42	14	15	13	21	17	4		
Total	M. & F.	548	263	175	110	384	114	50	44·4 %	25·6 %
B.		18	4	9	5	12	4	2		
C.		17	4	7	6	9	1	7		
Subsidiary		1	—	—	1	—	—	1		
		584	271	191	122	405	119	60		
II. Operative—A.	0-10 M.	1	1	—	—	1	—	—		
	11-15 M.	1	1	—	—	1	—	—		
	16-20 F.	1	1	—	—	1	—	—		
	21-25 M.	3	3	—	—	3	—	—		
	26-45M.	9	5	2	2	6	2	1		
	26-45 F.	2	2	—	—	1	1	—		
		11	7	2	2	7	3	1		
	46-60 M.	3	3	—	—	1	2	—		
	61- M.	2	1	—	1	1	—	1		
Total	M. & F.	22	17	2	3	15	5	2	63·6 %	4·5 %
B.	11-15 M.	2	—	2	—	2	—	—		
	16-20 M.	3	1	2	—	3	—	—		
	26-45 M.	6	2	3	1	4	2	—		
	26-45 M.	2	1	—	1	2	—	—		
		8	3	3	2	6	2	—		
	46-60 M.	1	—	—	1	—	1	—		
	61- M.	4	—	2	2	1	1	2		
Total	M. & F.	18	4	9	5	12	4	2	16·6 %	50 %

Fracture.	Age Group (Years).	No. of Cases.	Anatomical Result.			Functional Result.			Percent. of Good Anat. and Good Funct.	Percent. of Mod. or Bad Anat. with Good Funct.
			Good	Mod.	Bad	Good	Mod.	Bad		
IV. (a) Tibia and Fibula—Shafts. II. Operative *—continued.*										
C.	0-10 M.	1	1	—	—	1	—	—		
	16-20 M.	3	1	1	1	2	—	1		
	21-25 M.	1	—	1	—	1	—	—		
	26-45 M.	7	2	3	2	4	1	2		
	26-45 F.	1	—	—	1	—	—	1		
		8	2	3	3	4	1	3		
	46-60 M.	3	—	1	2	1	—	2		
	61- F.	1	—	1	—	—	—	1		
Total	(M. & F.)	17	4	7	6	9	1	7	23·5 %	29·4 %
IV. (b) Pott's. I. Non-Operative	0-10 M.	1	1	—	—	1	—	—		
	11-15 M.	7	6	1	—	7	—	—		
	11-15 F.	1	1	—	—	1	—	—		
		8	7	1	—	8	—	—		
	16-20 M.	2	—	2	—	1	—	1		
	16-29 F.	2	1	1	—	1	1	—		
		4	1	3	—	2	1	1		
	21-25 M.	7	3	3	1	4	1	2		
	21-25 F.	4	2	2	—	2	2	—		
		11	5	5	1	6	3	2		
	26-45 M.	70	35	28	7	43	19	8		
	26-45 F.	43	27	10	6	19	14	10		
		113	62	38	13	62	33	18		
	46-60 M.	54	27	20	7	23	18	13		
	46-60 F.	29	13	12	4	9	13	7		
		83	40	32	11	32	31	20		
	61 M.	18	7	3	8	7	2	9		
	61 F.	8	1	5	2	1	3	4		
		26	8	8	10	8	5	13		
Total	(M. & F.)	216	124	87	35	119	73	54	37·5%	10·4%
B. ..		2	1	1	—	1	1	—		
C. ..		4	—	1	3	—	1	3		
Subsid. ..		2	—	1	1	—	1	1		
		254	125	90	39	129	76	58		
II. Operative—A.	16-20 M.	1	1	—	—	1	—	—		
	46-60 M.	2	1	1	—	—	1	1		
	46-60 F.	1	1	—	—	1	—	—		
		3	2	1	—	1	1	1		
Total	(M. & F.)	4	3	1	—	2	1	1	50%	
B.	26-45 M.	1	1	—	—	1	—	—		
	46-60 M.	1	—	1	—	—	1	—		
Total B.		2	1	1	—	1	1	—	50 %	
C.	26-45 M.	1	—	—	1	—	—	1		
	46-60 M.	2	—	—	2	—	—	2		
	61-M.	1	—	1	—	—	1	—		
Total C.		4	—	1	3	—	1	3		

Fracture.	Age Group (Years).	No. of Cases.	Anatomical Result.			Functional Result.			Percent. of Good Anat. and Good Funct.	Percent. of Mod. or Bad Anat. with Good Funct.
			Good	Mod.	Bad	Good	Mod.	Bad		
V. (a) Humerus—Anatomical Neck.										
I. Non-Operative	11-15 M	1	1	—	—	1	—	—		
	26-45 M	2	2	—	—	2	—	—		
	46-60 F.	1	1	—	—	1	—	—		
Total	—	4	4	—	—	4	—	—	80 %	0·0%
Subsidiary	—	1	—	—	1	—	—	1		
II. Operative A.	46-60 M	1	1	—	—	1	—	—		
	46-60 F.	1	1	—	—	1	—	—		
		2	2	—	—	2	—	—	100 %	
V. (b) Humerus—Upper Epiphysis.										
	0-10 M	1	1	—	—	1	—	—		
	0-10 F	3	2	—		3	—	—		
		4	3	—	1	4	—	—		
	16-20 M	1	1	—	—	1	—	—		
Total	(M. & F.	5	4	—	1	5	—	—	80%	20%
II. Operative A.	0-10 F.	1	1	—	—		—	—		
	16-20 M	1	1	—	—	1	—	—		
		2	2	—	—	2	—	—	100 %	
V. (c) Humerus—Tuberosity.										
I. Non-Operative,	26-45 F.	1	1	—	—	1	—	—		
	46-60 M	1	—	1	—	—		—		
Subsidiary	46-60 M	1	—	1	—	—		—		
		3	1	2	—	1	2	—		
V. (d) Humerus—Surgical Neck										
I. Non-Operative	0-10 M.	3	3	—	—	3	—	—		
	0-10 F.	1	1	—	—	1	—	—		
	11-15 M.	2	2	—	—	2	—	—		
	16-20 M.	4	2	1	1	4	—	—		
	26-45 M.	5	3	1	1	3	1	1		
	46-60 M.	6	5	1	—	6	—	—		
	46-60 F.	5	3	2	—	2	3	—		
	61-M.	7	1	4	2	3	1	3		
	61-F.	4	2	1	1	1	2	1		
Total	—	37	22	10	5	25	7	5	45·0%	17·5%
B.	—	4	4	—	—	4	—	—		
C.	—	3	2	1	—	3	—	—		
Subsidiary	—	3	—	1	2	—	—	3		
Total	—	47	28	12	7	32	7	8		
II. Operative A.	11-15 F.	1	1	—	—	1	—	—		
	16-20 M.	1	1	—	—	1	—	—		
	46-60 M.	1	—	—	1	—	—	1		
	46-60 F.	1	—	1	—	—	1	—		
		4	2	1	1	2	1	1		
	61-F.	1	1	—	—	1	—	—		
	61-M.	1	1	—	—	1	—	—		
Total A.	(M.& F.)	6	4	1	1	4	1	1	60 %	
B.	0-10 M.	2	2	—	—	2	—	—		
	26-45 M.	2	2	—	—	2	—	—		
Total B.		4	4	—	—	4	—	—		
C.	11-15 M.	1	—	1	—	1	—	—		
	16-20 M.	1	1	—	—	1	—	—		
	26-45 M.	1	1	—	—	1	—	—		
Total C.	—	3	2	1	—	3	—	—		

Fracture	Age Group (Years).	No. of Cases	Anatomical Result.			Functional Result.			Percent of Good Anat. and Good Funct.	Percent. of Mod. or Bad Anat. with Good Funct.
			Good	Mod.	Bad	Good	Mod.	Bad		
V. (e) Humerus—Shaft.										
I. Non-operative	0-10 M.	7	6	1	—	7	—	—		
	0-10 F.	6	3	1	2	4	2	—		
		13	9	2	2	11	2	0		
	11-15 M.	5	2	3	—	4	1	—		
	16-20 M.	11	6	5	—	11	—	—		
	16-20 F.	1	1	—	—	1	—	—		
		12	7	5	—	12	—	—		
	21-25 M.	1	—	1	—	1	—	—		
	21-25 F.	2	—	1	1	1	1	—		
		3	—	2	1	2	1	—		
	26-45 M.	14	9	4	1	10	3	1		
	26-45 F.	1	1	—	—	1	—	—		
		15	10	4	1	11	3	1		
	46-60 M.	13	11	2	—	12	1	—		
	46-60 F.	4	3	1	—	3	1	—		
		17	14	3	—	15	2	—		
	61-M.	3	2	—	1	2	1	—		
Total	M. & F.	68	44	19	5	57	10	1	64·5%	21·9%
B.		7	6	1	—	6	—	1		
C.		6	4	2	—	2	2	2		
Subsidiary		5	3	—	2	3	2	—		
Total		86	57	22	7	68	14	4		
II. Operative— A.	16-20 M.	3	3	—	—	3	—	—		
	21-25 F.	1	1	—	—	1	—	—		
	26-45 M.	1	1	—	—	—	1	—		
	46-60 F.	1	1	—	—	1	—	—		
Total A.		6	6	—	—	5	1	—	83·3%	
B.	0-10 M.	1	1	—	—	1	—	—		
	16-20 M.	1	1	—	—	1	—	—		
	20-21 F.	1	1	—	—	1	—	—		
	26-45 M.	3	3	—	—	3	—	—		
	61-M.	1	—	1	—	—	—	1		
Total B.		7	6	1	—	6	—	1		
C.	0-10 F.	1	1	—	—	1	—	—		
	26-45 M.	1	—	1	—	1	—	—		
	46-60 M.	4	3	—	1	—	2	2		
Total C.		6	4	1	1	2	2	2		
V. (f) Humerus—Supra-condylic.										
I. Non-Operative.	0-10 M.	4	2	2	—	3	1	—		
	0-10 F.	2	2	—	—	2	—	—		
	11-15 M.	2	2	—	—	2	—	—		
	16-20 M.	4	—	4	—	1	3	—		
	21-25 M.	1	—	—	1	—	—	1		
	26-45 F.	1	—	—	1	—	—	1		
	46-60 M.	2	—	2	—	—	1	1		
	61 M.	1	1	—	—	1	—	—		
Total		17	7	8	2	9	5	3	41·1%	11·1%

Fracture.	Age Group (Years).	No. of Cases.	Anatomical Result.			Functional Result.			Percent. of Good Anat. and Good Funct.	Percent. of Mod. or Bad Anat. with Good Funct.
			Good	Mod.	Bad	Good	Mod.	Bad		
V. (f) Humerus—Supra-condylic.										
I. Non-Operative—*continued.*										
B.		5	2	—	3	2	2	1		
C.		1	1	—	—	—	1	—		
Subsid. ..		1	—	—	1	—	—	1		
		24	10	8	6	11	8	5		
II. Operative A.	11-15 M.	1	—	1	—	1	—	—		
B.	0-10 M.	2	—	—	2	1	1	—		
	16-20 M.	1	—	—	1	—	—	1		
	21-25 M.	1	1	—	—	1	—	—		
	46-60 M.	1	1	—	—	—	1	—		
		5	2	—	3	2	2	1		
C.	1-25M.	1	1	—	—	—	1	—		
V. Humerus—Various.										
Capitellum.										
II. Operative A.	0-10 M.	1	—	1	—	1	—	—		
V. (g) Humerus—Lower Epiphysis.										
I. Non-Operative	0-10 M.	28	17	5	6	23	4	1		
	0-10 F.	10	3	5	2	8	2	—		
		38	20	10	8	31	6	1		
	11-15 M.	9	4	3	2	5	2	2		
	16-20 M.	3	2	—	1	2	—	1		
		50	26	13	11	38	8	4	44·0%	22·0%
Subsid. ..		9	—	2	7	1	2	6		
B.		3	1	—	2	1	1	1		
C.		3	—	2	1	—	2	1		
		65	27	17	21	40	13	12		
II. Operative—A ..	0-10 M.	7	3	1	3	4	2	1		
	0-10 F.	3	3	—	—	3	—	—		
	15-20 M.	1	1	—	—	1	—	—		
	11-15 F.	3	2	1	—	1	2	—		
Total A.		14	9	2	3	9	4	1	57·1%	7·1%
B.	0-10 M.	2	1	—	1	1	1	—		
	11-15 M.	1	—	—	1	—	—	1		
Total B.		3	1	—	2	1	1	1		
C.	0-10 M.	1	—	1	—	—	1	—		
	16-20 M.	2	—	1	1	—	1	1		
Total C.		3	—	2	1	—	2	1		
V. (h) Humerus—Int. Condyle.										
I. Non-Operative	0-10 F.	1	—	1	—	1	—	—		
	0-10 M.	4	1	—	3	2	—	2		
	11-15 M.	6	4	2	—	5	1	—		
	16-20 M.	4	3	1	—	2	2	—		
	20-45 M.	1	1	—	—	1	—	—		
	61-0 M.	1	—	1	—	—	1	—		
		17	9	5	3	11	4	2	41·1%	23·5%
II. Operative B.		1	—	1	—	—	1	—		

Fracture.	Age Group (Years).	No. of Cases.	Anatomical Result.			Functional Result.			Percent. of Good Anat. and Good Funct.	Percent. of Mod. or Bad Anat. with Good Funct.
			Good	Mod.	Bad	Good	Mod.	Bad		
V. (h) Humerus—Ext. Condyle.										
I. Non-Operative	0-10 M.	2	1	1	—	2	—	—		
	11-15 M.	3	—	3	—	2	1	—		
	16-20 M.	1	—	1	—	—	1	—		
	21-25 M.	1	—	1	—	—	1	—		
Total		7	1	6	—	4	3	—	14·2%	28·4
V. (e) (g) (d) (f) (c) (a). Humerus (various)—										
I. Non-Operative Subsid. Operation										
Shaft.	0-10 F.	1	1	—	—	1	—	—		
	11-15 M.	1	—	—	1	—	1	—		
	16-20 M.	1	—	—	1	—	1	—		
	21-25 M.	1	1	—	—	1	—	—		
	26-45 M.	1	1	—	—	1	—	—		
Total	(M. & F.)	5	3	—	2	3	2	—		
Lower Epiphysis	0-10 M.	4	—	1	3	1	—	3		
	16-20 M.	1	—	—	1	—	1	—		
	26-45 M.	2	1	—	1	1	—	1		
	16-20 F.	2	—	1	1	—	1	1		
Total	(M. & F.)	9	1	2	6	2	2	5		
Surgical Neck.	26-45 M.	1	—	—	1	—	—	1		
	46-60 M.	1	—	—	1	—	—	1		
	46-60 F.	1	—	1	—	—	—	1		
Total	(M & F.)	3	—	1	2	—	—	3		
Supra-condylic	46-60 M.	1	—	—	1	—	—	1		
Excision of Tuberosity	46-60 F.	1	—	1	—	—	1	—		
Anatomical Neck.	61-	1	—	—	—	—	—	—		
VI. (a) Radius—Upper Epiphysis.										
I. Non-Operative	0-10 M.	1	—	1	—	—	1	—		
	11-15 M.	1	1	—	—	1	—	—		
Total		2	1	1	—	1	1	—	50%	
VI. (b) Radius—Shaft.	0-10 M.	6	5	1	—	5	1	—		
I. Non-Operative	0-10 F.	7	5	2	—	6	1	—		
		13	10	3	—	11	2	—		
	11-15 M.	6	4	1	1	5	1	—		
	16-20 M.	10	6	3	1	7	3	—		
	16-20 F.	2	1	—	1	1	—	1		
		12	7	3	2	8	3	1		
	21-25 M.	2	1	—	1	2	—	—		
	21-25 F.	1	1	—	—	1	—	—		
		3	2	—	1	3	—	—		
	26-45 M.	3	1	2	—	2	1	—		
	26-45 F.	3	1	2	—	1	2	—		
		6	2	4	—	3	3	—		
	46-60 M.	3	—	—	3	—	1	2		
	46-60 F.	1	1	—	—	—	1	—		
		4	1	—	3	—	2	2		
	61-M.	1	1	—	—	1	—	—		
	61-F.	0	—	—	—	—	—	—		
Total	(M. & F.)	45	27	11	7	31	11	3	53·1%	12·7%
B.	—	3	—	—	3	2	—	1		
C.	—	4	—	3	1	1	3	—		
Subsidiary	—	2	1	—	1	1	—	1		
		54	28	14	12	35	14	5		

Fracture.	Age Group (Years).	No. of Cases.	Anatomical Result. Good	Mod.	Bad	Functional Result. Good	Mod.	Bad	Percent. of Good Anat. and Good Funct.	Percent. of Mod. or Bad Anat. with Good Funct.
VI. (b) Radius—Shaft. *—continued.*										
II. Operative										
A.	0-10 M.	1	1	—	—	1	—	—		
	11-15 M.	2	1	1	—	2	—	—		
	11-15 F.	1	1	—	—	1	—	—		
		3	2	1	—	3	—	—		
	21-25 M.	1	1	—	—	1	—	—		
	26-45 M.	1	—	—	1	—	—	1		
	26-45 F.	1	—	1	—	—	—	1		
		3	—	1	1	—	—	2		
Total A	(M & F.)	7	4	2	1	5	—	2	57·1 %	14·2 %
B.	26-45 M.	1	—	—	1	1	—	0		
	46-60 F.	1	—	—	1	1	—	—		
Total B.	(M. & F.)	2	—	—	2	2	—	—	—	100 %
C.	21-25 F.	1	—	1	—	1	—	—		
	26-45 M.	4	—	2	2	—	3	1		
Total C.	(M.& F.)	5	—	3	1	1	3	1	—	25 %
VI. (c) Radius—Lower Epiphysis										
I. Non-Operative	0-10 M.	4	3	1	—	3	1	—		
	0-10 F.	1	1	—	—	—	1	—		
		5	4	1	—	3	2	—		
	11-15 M.	6	3	2	1	5	1	—		
	16-20 M.	3	3	—	—	3	—	—		
	17-20 F.	1	1	—	—	1	—	—		
		4	4	—	—	4	—	—		
Total	(M.&F.)	15	11	3	1	12	3	—	66·6 %	13·3 %
II. Operative— A.	0-10	1	1	—	—	1	—	—	100 %	
VII. (a) Ulna—Olecranon										
I. Non-operative	0-10 F.	1	—	1	—	1	—	—		
	11-15 M.	1	—	1	—	1	—	—		
	16-20 M.	3	3	—	—	3	—	—		
	21-25 F.	1	—	1	—	1	—	—		
	26-45 M.	6	3	3	—	4	1	1		
	46-60 M.	2	1	—	1	1	1	—		
	46-60 F.	2	1	1	—	2	—	—		
		4	2	1	1	3	1	—		
	61- M.	4	2	1	1	2	1	1		
Total	(M.&F.)	20	10	8	2	15	3	2	45 %	30 %
B.		12	11	—	1	9	1	2		
C.		6	4	1	1	3	1	2		
		38	25	9	4	27	5	6		

Fracture.	Age Group (Years)	No. of Cases	Anatomical Result. Good	Mod.	Bad	Functional Result. Good	Mod.	Bad	Percent of Good Anat. and good Funct.	Percent. of Mod. or Bad Anat. with Good Funct.
VII (a) Ulna—Olecranon *—continued.*										
II. Operative A.	0-10 M.	1	1	—	—	1	—	—		
	16-20 M.	1	1	—	—	1	—	—		
	21-25 M.	1	1	—	—	1	—	—		
	26-45 M.	11	10	1	—	9	2	—		
	26-45 F.	2	2	—	—	1	1	—		
		13	12	1	—	10	3	—		
	46-60 M.	2	2	—	—	2	—	—		
	61- F.	1	—	1	—	—	1	—		
Total	(M.&F.)	19	17	2	—	15	4	—	73·6 %	5·2 %
B.	26-45 M.	8	8	—	—	8	—	—		
	26-45 F.	1	1	—	—	—	1	—		
		9	9	—	—	8	1	—		
	46-60 M.	3	3	—	—	1	1	1		
		3	3	—	—	1	1	1		
Total B.		12	12	—	—	9	2	1		
C.	16-20 M.	1	1	—	—	—	1	—		
	26-45 M.	4	2	1	1	2	—	2		
	46-60 M.	1	1	—	—	1	—	—		
	46-60 F.	1	—	—	1	—	—	1		
Total C.		7	4	1	2	3	1	3		
VII. (b) Ulna—Shaft.										
I. Non-Operative	0-10 M.	6	6	—	—	5	1	—		
	0-10 M.	1	1	—	—	1	—	—		
		7	7	—	—	6	—	—		
	11-15 M.	3	1	1	1	3	—	—		
	21-25 M.	1	1	—	—	1	—	—		
	26-45 M.	2	2	—	—	2	—	—		
	26-45 F.	1	1	—	—	1	—	—		
		3	3	—	—	3	—	—		
	46-60 M.	1	—	1	—	—	1	—		
	46-60 F.	1	1	—	—	1	—	—		
	61. M.	2	2	—	—	2	—	—		
Total	(M & F.)	18	15	2	1	16	2	—	77·7%	11·1%
B. ..	—	2	—	1	1	—	1	1		
C. ..	—	2	—	1	1	1	—	1		
		22	15	4	3	17	3	2		
II. Operative— A. ..	61-M.	1	—	—	1	—	1	—		
B. ..	11-15 M.	1	—	—	1	—	1	—		
	46-60 M.	1	—	1	—	—	—	1		
Total B.	..	2	—	1	1	—	1	1		
C. ..	16-20 M.	1	—	1	—	1	—	—		
	26-45 M.	1	—	—	1	—	—	1		
Total C.	..	2	—	1	1	1	—	1		
VII. (c) Ulna—Lower Epiphysis.										
1. Non-Operative	11-15 M.	1	1	—	—	1	—	—		
	16-20 M.	1	1	—	—	1	—	—		
Total	..	2	2	—	—	2	—	—	100 %	

Fracture.	Age Group (Years).	No. of Cases.	Anatomical Result.			Functional Result.			Percent. of Good Anat. and Good Funct.	Percent. of Mod. or Bad Anat. with Good Funct.
			Good	Mod.	Bad	Good	Mod.	Bad		
VIII. (a) Radius & Ulna —Shafts.										
I. Non-Operative	0-10 M.	22	14	4	4	15	4	3		
	0-10 F.	7	4	1	—	6	—	1		
		29	18	5		21	4	4		
	11-15 M.	19	13	4		9	10	—		
	11-15 F.	6	3	—	1	4	1	1		
		25	16	8		13	11	1		
	16-20 M.	5	—	4	1	2	2	1		
	16-20 F.	1	—	—	—	1	—	—		
		6	—		1	3		1		
	21-25 M.	2	1	1		1	1	—		
	26-45 M.	7	1	4	2	2	4	1		
	46-60 M.	4	—	1	3	—	1	3		
	46-60 F.	3	1	2	—	2	1	—		
		7	1	3	3	2	2	3		
Total	M. & F.	76	37	26	13	42	24	10	38·0%	17·1%
B... ..	—	3	—	1	2	1	1	1		
C... ..	—	10	1	3	6	2	3	5		
	—	89	38	34	17	45	28	16		
II. Operative— A... ..	0-10 M.	1	1	—	—	1	—	—		
	11-15 M.	1	1	—	—	1	—	—		
	11-15 F.	2	2	—	—	2	—	—		
		3	3	—	—	3	—	—		
	16-20 M.	2	2	—	—	2	—	—		
	26-45 M.	2	—	2	—	—	2	—		
		2	—	2	—	—	2	—		
Total A.	M. & F.	8	6	2	—	6	2	—	75%	
B... ..	0-10 F.	1	—	1	—	1	—	—		
	11-15 M.	2	—	—	2	—	1	1		
Total B.	M. & F.	3	—	1	2	1	1	1		
C... ..	0-10 F.	2	1	1	—	1	1	—		
	11-15 M.	1	—	1	—	1	—	—		
	16-20 M.	2	—	—	2	—	—	2		
	26-45 M.	2	—	1	1	—	1	1		
	26-45 F.	1	—	—	1	—	1	—		
		3	—	1	2	—	2	1		
	46-60 M.	2	—	—	2	—	—	2		
Total C.	M. & F.	10	1	3	6	2	3	5		

Fracture.	Age Group (Years).	No. of Cases	Anatomical Result.			Functional Result.			Percent of Good Anat. and Good Funct.	Percent. of Mod. or Bad Anat. with Good Funct.
			Good	Mod.	Bad	Good	Mod.	Bad		
VIII. (b) Colles's Fracture.										
I. Non-Operative	0-10 M.	1	1	—	—	1	—	—		
	11-15 M.	3	3	—	—	3	—	—		
	16-20 M.	2	1	1	—	2	—	—		
	21-25 M.	2	2	—	—	2	—	—		
	21-25 F.	2	—	2	—	2	—	—		
		4	2	2	—	4	—	—		
	26-45 M.	14	3	8	3	6	5	3		
	26-45 F.	2	1	1	—	2	—	—		
		16	4	9	3	8	5	3		
	46-60 M.	7	1	4	2	4	2	1		
	46-60 F.	7	1	5	1	4	4	3		
		14	2	9	3	8	5	1		
	61- M.	2	—	2	—	—	2	—		
	61- F.	5	—	2	3	1	4	—		
		7	—	4	3	1	6	—		
Total	M. F.	47	13	25	9	27	16	4	27·6%	29·7%
C. ..	..	1	—	1	—	—	1	—		
Total	M. & F.	48	13	26	9	27	17	4		
II. Operative A.	46-60 F.	1	1	—	—	1	—	—		
C. ..	26-45 M.	1	—	1	—	—	1	—		

2. For convenience of reference, the results of each individual fracture are set out in squares (Table II).

In the case of each fracture it is possible, according to the method of investigation adopted, to have nine different results, viz. :—

Good anatomical with **good functional** result.
Moderate anatomical with **good functional** result
Bad anatomical with **good functional** result.

Good anatomical with **moderate functional** result.
Moderate anatomical with **moderate functional** result.
Bad anatomical with **moderate functional** result.

Good anatomical with **bad functional** result.
Moderate anatomical with **bad functional** result.
Bad anatomical with **bad functional** result.

The number of each of these results in each fracture investigated is indicated in the squares.

The anatomical results are noted in the horizontal spaces and the functional in the vertical spaces of the square.

The non-operative results are given first (I.).

The operative Class A. next (II.—Class A.).

The operative Classes B and C are given together.

TABLE II.

Femur—Neck.

I. NON OPERATIVE.

Cases: 91.

Functional.

Anatomical.	Good.	Mod.	Bad.
Good.	15	2	1
Mod.	8	19	12
Bad.	1	7	26

II OPERATIVE.

Class A.

Cases: 1.

Functional.

Anatomical.	Good.	Mod.	Bad.
Good.	1	0	0
Mod.	0	0	0
Bad.	0	0	0

Class B.

Case: 1. Good anat. with bad functional result.

Femur—Sep. Epiph. of Head.

I. NON-OPERATIVE.

Cases: 9.

Functional.

Anatomical.	Good	Mod.	Bad
Good	4	0	0
Mod.	2	1	1
Bad	0	0	1

II. OPERATIVE.

Cases: 0.

Femur—Upper ⅓ of Shaft.

I. NON-OPERATIVE.

Cases: 96.

Functional.

Anatomical.	Good	Mod.	Bad
Good	52	1	0
Mod.	12	10	1
Bad	4	4	12

II OPERATIVE.

Class A.

Cases: 3.

Functional.

Anatomical.	Good	Mod.	Bad
Good	3	0	0
Mod.	0	0	0
Bad	0	0	0

Classes B. and C.

Cases: 8.

Functional.

Anatomical.	Good	Mod.	Bad
Good	1	0	0
Mod.	2	0	0
Bad	0	0	5

Femur—Middle ⅓.

I. NON-OPERATIVE.

Cases: 438.

Functional.

Anatomical.	Good	Mod.	Bad
Good	297	14	3
Mod.	56	20	7
Bad	11	14	16

II. Operative.

Class A.

Cases: 27.

Functional.

Anatomical.	Good	Mod.	Bad
Good	25	0	0
Mod.	0	2	0
Bad	0	0	0

Classes B. and C.

Cases: 19.

Functional.

Anatomical.	Good	Mod.	Bad
Good	10	0	0
Mod.	2	2	1
Bad	1	0	3

Femur—Lower ⅓ of Shaft.

I. Non-Operative.

Cases: 104.

Functional.

Anatomical.	Good	Mod.	Bad
Good	61	1	1
Mod.	12	12	0
Bad	4	6	7

II. Operative.

Class A.

Cases: 2.

Functional.

Anatomical.	Good.	Mod.	Bad
Good	1	0	0
Mod.	0	0	0
Bad	0	1	0

Classes B. and C.

Cases: 6.

Functional.

Anatomical.	Good	Mod.	Bad
Good	0	2	0
Mod.	1	0	0
Bad	1	1	1

Lower Extremity of Femur—Involving Knee-Joint.

I. Non-Operative.

Cases: 12.

Functional.

Anatomical.	Good	Mod.	Bad
Good	5	0	0
Mod.	1	1	0
Bad	0	2	3

II. Operative.

Class A.

Cases: 1. Mod. anatomical with mod. functional result.

Classes B. and C.

Cases: 5.

Functional.

Anatomical.	Good	Mod.	Bad
Good	0	0	0
Mod.	0	1	0
Bad	0	1	3

Femur—Lower Epiphysis.

I. Non-Operative.

Cases: 9.

Functional.

Anatomical.	Good	Mod.	Bad
Good	5	1	1
Mod.	0	0	0
Bad	1	1	0

II. OPERATIVE.

Class A. = 0.

Class C.

Cases: 1. Bad anat. with bad functional result.

Tibia—Shaft.

I. NON-OPERATIVE.

Cases: 426.

Anatomical.	Functional. Good	Mod.	Bad
Good	317	15	5
Mod.	41	17	9
Bad	5	7	10

II. OPERATIVE

Class A.

Cases: 17.

Anatomical.	Functional. Good	Mod.	Bad
Good	13	0	0
Mod.	2	0	1
Bad	1	0	0

Classes B. and C.

Cases: 3.

Anatomical.	Functional. Good	Mod.	Bad
Good	1	0	0
Mod.	1	0	0
Bad	0	1	0

Tibia—Lower Epiphysis.

I. NON-OPERATIVE.

Cases: 3.

Anatomical.	Functional. Good	Mod.	Bad
Good	3	0	0
Mod.	0	0	0
Bad	0	0	0

II. OPERATIVE.

No Cases.

Tibia—Internal Malleolus.

I. NON-OPERATIVE.

Cases: 2.

Anatomical.	Functional. Good	Mod.	Bad
Good	1	0	0
Mod.	0	1	0
Bad	0	0	0

II. OPERATIVE.

No Cases.

Fibula—Shaft.

I. NON-OPERATIVE.

Cases: 153.

Anatomical.	Functional. Good	Mod.	Bad
Good	108	14	5
Mod.	6	7	5
Bad	0	2	6

II. OPERATIVE.

Class A.

1 *Case*: Good—good.

Classes B. and C. = 0.

Fibula—External Malleolus.

I. Non-Operative.

2 *Cases*: Both good anat. with good functional result.

II. Operative.

No cases.

Tibia and Fibula, Shafts.

I. Non-Operative.

Cases: 549.

Functional.

Anatomical.	Good.	Mod.	Bad.
Good	244	17	2
Mod.	111	46	18
Bad	30	50	31

II. Operative.

Class A.

Cases: 22.

Functional.

Anatomical.	Good.	Mod.	Bad.
Good	14	3	0
Mod.	1	1	0
Bad	0	1	2

Classes B and C.

Cases: 35.

Functional.

Anatomical.	Good.	Mod.	Bad.
Good	7	1	0
Mod.	12	1	3
Bad	2	3	6

Pott's Fracture.

I. Non-Operative.

Cases: 248.

Functional.

Anatomical.	Good.	Mod.	Bad.
Good	93	24	8
Mod.	23	40	25
Bad	3	10	22

II. Operative.

Class A.

Cases: 4.

Functional.

Anatomical.	Good.	Mod.	Bad.
Good	2	1	0
Mod.	0	0	1
Bad	0	0	0

Classes B and C.

Cases: 6.

Functional.

Anatomical.	Good.	Mod.	Bad.
Good	1	0	0
Mod.	0	2	0
Bad	0	0	3

Humerus—Anatomical Neck.

I. Non Operative.

Cases: 5.

Functional.

Anatomical.	Good.	Mod.	Bad.
Good	4	0	0
Mod.	0	0	0
Bad	0	0	1

II. OPERATIVE.

Class A.

Cases: 2.

Functional.

Anatomical.	Good	Mod.	Bad
Good	2	0	0
Mod.	0	0	0
Bad	0	0	0

Humerus—Upper Epiphysis.

I. NON-OPERATIVE.

Cases: 5

Functional.

Anatomical.	Good	Mod.	Bad
Good	4	0	0
Mod.	0	0	0
Bad	1	0	0

II. OPERATIVE.

Class A.

Cases: 2.

Functional.

Anatomical.	Good	Mod.	Bad
Good	2	0	0
Mod.	0	0	0
Bad	0	0	0

Classes B and C. = 0.

Humerus—Fracture of Tuberosity.

I. NON-OPERATIVE.

Cases: 3.

Functional.

Anatomical.	Good	Mod.	Bad
Good		0	0
Mod.	0	2	0
Bad	0	0	0

Humerus—Surgical Neck.

I. NON-OPERATIVE.

Cases: 40.

Functional.

Anatomical.	Good	Mod.	Bad
Good	18	4	0
Mod.	6	3	2
Bad	1	0	6

II. OPERATIVE.

Class A.

Cases: 6.

Functional.

Anatomical.	Good	Mod.	Bad
Good	4	0	0
Mod.	0	1	0
Bad	0	0	1

Classes B. and C.

Cases: 7.

Functional.

Anatomical.	Good	Mod.	Bad
Good	6	0	0
Mod.	1	0	0
Bad	0	0	0

Humerus—Shaft.

NON-OPERATIVE.

Cases: 73.

Functional.

Anatomical.	Good	Mod.	Bad
Good	44	3	0
Mod.	14	5	0
Bad	2	4	1

II. OPERATIVE.

Class A.
Cases 6.

Functional.

Anatomical.	Good.	Mod.	Bad.
Good	5	1	0
Mod.	0	0	0
Bad	0	0	0

Classes B. and C.
Cases: 13.

Functional.

Anatomical.	Good	Mod.	Bad.
Good	7	2	1
Mod.	1	0	1
Bad.	0	0	1

Humerus.—Supra-condylic.

I. NON-OPERATIVE.

Cases: 18.

Functional.

Anatomical.	Good	Mod.	Bad
Good	7	0	0
Mod.	2	5	1
Bad	0	0	3

II. OPERATIVE.

Class A.
Cases: 1.
Mod. anatomical with good functional result.
Classes B. *and* C.
Cases: 6.

Functional.

Anatomical.	Good	Mod.	Bad
Good	1	2	0
Mod.	0	0	0
Bad	1	1	1

Humerus—Lower Epiphysis.

I. NON-OPERATIVE.

Cases 59.

Functional.

Anatomical.	Good	Mod.	Bad
Good	26	0	0
Mod.	10	5	0
Bad	3	5	10

II. OPERATIVE.

Class A.
Cases: 14.

Functional.

Anatomical.	Good	Mod.	Bad
Good	8	1	0
Mod.	0	2	0
Bad	1	1	1

Classes B. and C.
Cases: 6.

Functional.

Anatomical.	Good	Mod.	Bad
Good	1	0	0
Mod.	0	2	0
Bad	0	1	2

Humerus—Capitellum.

I. NON-OPERATIVE.

No cases.

II. OPERATIVE.

Class A.
Cases: 1.
Mod. anatomical with good functional result.

Humerus—Internal Condyle.

I. NON-OPERATIVE.

Cases: 17.

Functional.

Anatomical.	Good	Mod.	Bad
Good	7	2	0
Mod.	3	2	0
Bad	1	0	2

II. OPERATIVE.

Class A.

No Cases.

Class B.

1 *Case*: Mod.—Mod.

Humerus—Ext. Condyle.

I. NON-OPERATIVE.

Cases: 7.

Functional.

Anatomical.	Good.	Mod.	Bad
Good	1	0	0
Mod.	3	3	0
Bad	0	0	0

II. OPERATIVE.

No Cases.

Radius—Upper Epiphysis.

I. NON-OPERATIVE.

Cases: 2.

Functional.

Anatomical.	Good	Mod.	Bad
Good	1	0	0
Mod.	0	1	0
Bad	0	0	0

II. OPERATIVE.

No Cases.

Radius—Shaft.

I. NON-OPERATIVE.

Cases: 47.

Functional.

Anatomical.	Good	Mod.	Bad
Good	25	3	0
Mod.	4	7	0
Bad	2	2	4

II. OPERATIVE.

Class A.

Cases: 7.

Functional.

Anatomical.	Good	Mod.	Bad
Good	4	0	0
Mod.	1	0	1
Bad	0	0	1

Classes B. & C.

Cases: 7.

Functional.

Anatomical.	Good	Mod.	Bad
Good	0	0	0
Mod.	1	2	0
Bad	2	1	1

Radius—Lower Epiph.

I. NON-OPERATIVE.

Cases: 15.

Functional.

Anatomical.	Good	Mod.	Bad
Good	10	1	0
Mod.	1	2	0
Bad	1	0	0

II. OPERATIVE.

Class A.

1 *Case*: Good—Good.

Classes B. and C.

Cases: 0.

Ulna—Olecranon.

I. NON-OPERATIVE.

Cases: 20.

Functional.

Anatomical.	Good	Mod.	Bad
Good	9	1	0
Mod.	6	1	1
Bad	0	1	1

II. Operative.

Class A.

Cases: 19.

Functional.

Anatomical.	Good	Mod.	Bad
Good	14	3	0
Mod.	1	1	0
Bad	0	0	0

Classes B. and C.

Cases: 19.

Functional.

Anatomical.	Good	Mod.	Bad
Good	12	3	1
Mod.	0	0	1
Bad	0	0	2

Ulna.—Shaft.

I. Non-Operative.

Cases: 18.

Functional.

Anatomical.	Good.	Mod.	Bad.
Good	14	1	0
Mod.	1	1	0
Bad	1	0	0

II. Operative.

Class A.

1 Case: Bad Anatomical—Mod. Functional.

Classes B and C.

Cases: 4.

Functional.

Anatomical.	Good.	Mod.	Bad.
Good	0	0	0
Mod.	1	0	1
Bad	0	1	1

Ulna.—Lower Epiphysis.

I. Non-Operative.

Cases: 2.

Both Good—Good.

II. Operative.

Cases: 0.

Radius and Ulna—Shafts.

I. Non-Operative.

Cases: 76.

Functional.

Anatomical.	Good.	Mod.	Bad.
Good	29	8	0
Mod.	11	12	3
Bad	2	4	7

II. Operative.

Class A.

Cases: 8.

Functional.

Anatomical.	Good.	Mod.	Bad.
Good	6	0	0
Mod.	0	2	0
Bad	0	0	0

Classes B. *and* C,

Cases: 13.

Functional.

Anatomical.	Good.	Mod.	Bad.
Good	0	1	0
Mod.	3	1	0
Bad	0	2	6

Colles's Fracture.

I. Non-Operative.

Cases: 47.

Functional.

Anatomical.	Good.	Mod.	Bad.
Good	13	0	0
Mod.	11	11	3
Bad	3	5	1

II. OPERATIVE.

Class A.

Cases: 1.

Good anatomical, good functional result.

Class C.

Cases: 1.

Good anatomical with moderate functiona result.

3. The answers to the four following questions appear to the Committee to afford in a compact form the most important information with reference to the result of treatment of any given fracture:—

(i.) Of a given method, what is the percentage of good result—*i.e.*, a good anatomical combined with a good functional result?

(ii.) Of a given method, what percentage of results are bad both anatomically and functionally?

(iii.) What is the frequency of a good functional result when the anatomical result is defective?

(iv.) What is the frequency of an imperfect functional result if the anatomical result be bad?

The answers to these questions are given in Table III., which shows in four columns the number of each fracture which were reported as (1) good anatomically and functionally; (2) Bad anatomically and functionally; (3) Defective anatomically but good functionally; (4) Good anatomically but defective functionally.

If desired, further statistics can be compiled from the squares given above.

TABLE III.

I. Non-Operative.

(I.) Lower Extremity.

Fracture.	No. of Cases.	Good Anat. Good Funct.	Bad Anat. Bad Funct.	Mod. or Bad Anat. Good Funct.	Good Anat. Mod. or Bad Funct.
FEMUR—					
Neck	91	15	26	9	3
Epiphysis of head	9	4	1	2	0
Shaft—Upper ⅓	96	52	12	16	1
,, Middle ⅓	438	297	16	67	17
,, Lower ⅓	104	61	7	16	2
Lower extremity (involving knee-joint)	12	5	3	1	0
Lower Epiphysis	9	5	0	1	2
TIBIA—					
Shaft	426	317	10	46	20
Lower Epiphysis	3	3	0	0	0
Inter. malleolus	2	1	0	0	0
FIBULA—					
Shaft	153	108	6	6	19
Ext. malleolus	2	2	0	0	0
TIBIA AND FIBULA—					
Shafts	549	244	31	141	19
Pott's	248	93	22	26	32
TOTALS	2142	1207	134	331	115
		56·3%	6·2%	15·4%	5·3%

(ii.) Upper Extremity.

Fracture.	No. of Cases.	Good Anat. Good Funct.	Bad Anat. Bad Funct.	Mod. or Bad Anat. Good Funct.	Good Anat. Mod. or Bad Funct.
HUMERUS—					
Anat. Neck	5	4	1	0	0
Upper Epiphysis	5	4	0	1	0
Tuberosity	3	1	0	0	0
Surg. Neck	40	18	6	7	4
Shaft	73	44	1	16	3
Supra-condylic	18	7	3	2	0
Lower Epiphysis	59	26	10	13	0
Int. Condyle	17	7	2	4	2
Ext. Condyle	7	1	0	3	0
RADIUS—					
Upper Epiphysis	2	1	0	0	0
Shaft	47	25	4	6	3
Lower Epiphysis	15	10	0	2	1
ULNA—					
Olecranon	20	9	1	6	1
Shaft	18	14	0	2	1
Lower Epiphysis	2	2	0	0	0
RADIUS AND ULNA—					
Shafts	76	29	7	13	8
Colles's	47	13	1	14	0
TOTALS	454	215	36	89	23
		=47·3%	=7·9%	17·4%	5·0%

II. Operative.

CLASS A.

(i.) Lower Extremity.

Fracture.	No. of Cases.	Good Anat. Good Funct.	Bad Anat. Bad Funct.	Mod. or Bad. Anat. Good Funct.	Good Anat. Mod. or Bad Funct.
FEMUR—					
Neck	1	1	0	0	0
Upper ⅓	3	3	0	0	0
Middle ⅓	27	25	0	0	0
Lower ⅓	2	1	0	0	0
Lower extremity involving joint	1	1	0	0	0
TIBIA—					
Shaft	17	13	0	3	0
FIBULA—					
Shaft	1	1	0	0	0
TIBIA AND FIBULA—					
Shafts	22	14	2	1	3
Pott's	4	2	0	0	1
TOTAL	78	61	2	4	4
		=78·2%	=2·5%	=5·0%	=5·0%

(ii.) Upper Extremity.

Fractures.	No. of Cases.	Good Anat. Good Funct.	Bad Anat. Bad Funct.	Mod. or Bad Anat. Good Funct.	Good Anat. Mod. or Bad Funct.
Humerus—					
Anat. Neck	2	2	0	0	0
Upper Epiphysis	2	2	0	0	0
Surg. Neck	6	4	1	0	0
Shaft	6	5	0	0	1
Capitellum	1	0	0	1	0
Lower Epiphysis	14	8	1	1	1
Supra-condylic	1	0	0	1	0
Radius—					
Shaft	7	4	1	1	0
Lower Epiphysis	1	1	0	0	0
Ulna—					
Olecranon	19	14	0	1	3
Shaft	1	0	0	0	0
Radius and Ulna—					
Shafts	8	6	0	0	0
Colles's	1	1	0	0	0
Totals	69	47	3	5	5
		=68·1%	=4·3%	=7·2%	=7·2%

Class B.

Lower and Upper Extremity.

Fractures.	No. of Cases.	Good Anat. Good Funct.	Bad Anat. Bad Funct.	Mod. or Bad Anat. Good Funct.	Good Anat. Mod. or Bad Funct.
Femur—					
Neck	1	0	0	0	0
Upper ⅓	1	1	0	0	0
Middle ⅓	10	6	1	0	0
Lower ⅓	2	0	0	1	1
Lower extremity involving knee joint	3	0	2	0	0
Tibia—					
Shaft	2	0	0	1	0
Tibia and Fibula—					
Shafts	18	3	2	9	1
Pott's	2	1	0	0	0
Humerus—					
Surg. Neck	4	4	0	0	0
Shaft	7	6	1	0	0
Supra-condylic	5	1	1	1	1
Lower Epiphysis	3	1	1	0	0
Inter. condyle	1	0	0	0	0
Ulna—					
Olecranon	12	9	0	0	3
Shaft	2	0	0	0	0
Radius—					
Shaft	2	0	0	2	0
Radius and Ulna—					
Shafts	3	0	1	1	0
Totals	78	32	8	15	6

Class C.

Lower and Upper Extremities.

Fractures.	No of Cases.	Good Anat. Good Funct.	Bad Anat. Bad Funct.	Mod. or Bad Anat. Good Funct.	Good Anat. Mod. or Bad Funct.
Femur—					
Upper ⅓	7	0	5	2	0
Middle ⅓	9	4	2	3	0
Lower ⅓	4	0	1	1	1
Lower Epiphysis	1	0	1	0	0
Lower Extremity involving knee joint	2	0	1	0	0
Tibia—					
Shaft	1	1	0	0	0
Tibia and Fibula—					
Shafts	17	4	4	5	0
Pott's	4	0	3	0	0
Humerus—					
Surg. Neck	3	2	0	1	0
Shaft	6	1	1	1	3
Supra-condylic	1	0	0	0	1
Lower Epiphysis	3	0	1	0	0
Ulna—					
Olecranon	7	3	2	0	1
Shaft	2	0	1	1	0
Radius—					
Shaft	5	0	1	1	0
Radius and Ulna—					
Shafts	10	0	5	2	1
Colles's	1	0	0	0	0
Totals	83	15	28	17	7

An analysis of all the results, non-operative and operative, clearly shows the interdependence of the anatomical and functional result. The total number of cases in which a good anatomical result was obtained is 1,736, and in no less than 1,576 of these the functional result was also good.

In other words:—

If the anatomical result be good the functional result is good in 90.7 per cent.

If the anatomical result be moderate or bad, the functional result is good in 380 out of 1,279—*i.e.*, 29.7 per cent.

If the anatomical result be bad, the functional result is bad in 176 out of 330—*i.e.*, 53.3 per cent.

4. In Table IV. are compared the results of operative and non-operative treatment.

TABLE IV.

Comparison of the results of Non-Operative and Operative Treatment.

I. Non-Operative.

No. of Cases.	Good Anat. Good Funct.	Bad Anat. Bad Funct.	Mod. or Bad Anat. Good Funct.	Good Anat. Mod. or Bad Funct.
2596	1422	169	419	138
	= 54·3%	= 6·5%	= 16·1%	= 5·3%

II. OPERATIVE.

(i.) Class A.

No. of Cases.	Good Anat. Good Funct.	Bad Anat. Bad Funct.	Mod.orBadAnat. Good Funct.	Good Anat. Mod. or Bad Funct.
147	108 = 73·4%	5 = 3·4%	9 = 6·1%	9 = 6·1%

(ii.) Class B.

No. of Cases.	Good Anat. Good Funct.	Bad Anat. Bad Funct.	Mod.orBadAnat. Good Funct.	Good Anat. Mod. or Bad Funct.
78	32 = 41·0%	8 = 10·2%	15 = 19·2%	6 = 7·6%

(iii.) Class C.

No. of Cases.	Good Anat. Good Funct.	Bad Anat. Bad Funct.	Mod.orBadAnat. Good Funct.	Good Anat. Mod. or Bad Funct.
83	15 = 18·0%	28 = 33·7%	17 = 20·4%	7 = 8·4%

The figures in 1st and 3rd Columns added together give the number of Cases in which a good functional result was obtained.

In considering both the non-operative and operative results it must be borne in mind that the methods employed varied greatly, and also that the operative treatment of fractures is as yet in its infancy. There is reason to suggest that as operative treatment is more extensively used, and if in such operations the less efficient methods of fixing the fragments are discarded, the results will show a considerable improvement on those above. Non-operative treatment, on the other hand, is thoroughly established; though it must be admitted that some recent modifications have been introduced, but not yet extensively used, so that judgment on the results would be somewhat premature.

5.—AGE GROUPS.

While the early analysis was based on the age groups defined in paragraph 11, it was found that for all practical purposes age groups might be condensed into children (0-15), and adult life (over 15).

An attempt has been made, on this basis, to determine the influence of age on the result of treatment.

TABLE V.

I. NON-OPERATIVE.

Under 15: 1,016 cases. Good functional result in 90·8 per cent.

Over 15: 1,580 cases. Good functional result in 45·4 per cent.

II. OPERATIVE (Class A).

Under 15: 64 cases. Good functional result in 93·6 per cent.

Over 15: 83 cases. Good functional result in 66·3 per cent.

In Table VI., three fractures are taken, and the percentages of good functional results (leaving the anatomical result out of consideration) are given for each age group.

In each succeeding age group the proportion of good results is smaller than in the preceding age group.

Analysis of the cases under age groups makes it clear that there is a progressive depreciation of the functional result of non-operative treatment as age advances; in other words, the older the patient the worse the result.

TABLE VI.

PERCENTAGES OF GOOD FUNCTIONAL RESULTS FOR EACH AGE GROUP (3 FRACTURES).

TIBIA AND FIBULA.—SHAFTS.	
0-10	93 per cent.
11-15	95 ,,
16-20	81 ,,
21-25	77 ,,
26-45	65 ,,
46-60	57 ,,
61–	50 ,,
RADIUS AND ULNA.—SHAFTS.	
0-10	72 per cent.
11-15	52 ,,
16-20	50 ,,
21-25	50 ,,
26-45	28 ,,
46-60	28 ,,
POTT'S.	
0-10	100 per cent.
11-15	100 ,,
16-20	50 ,,
21-25	54 ,,
26-45	54 ,,
46-60	38 ,,
61–	30 ,,

6. PERIOD OF INCAPACITATION.

As already pointed out, the details as to the period of incapacitation are available only in a small proportion of the cases. The result of this is that while the non-operative material is sufficiently large to yield a fairly reliable numerical value for the average length of convalescence—the operative is so small that no corresponding figure of any value can be obtained. The results of the analysis of the material available are set out in Table VII. This Table shows, for each group of fractures (a) the number of cases in which the period of incapacitation was stated; (b) the average duration in weeks of incapacitation; (c) the number of cases in which incapacitation was permanent.

The cases are grouped into:—I. Non-Operative; II. Operative. Each of these groups being divided into: (i.) Cases under 15 years of age; (ii.) Cases over 15 years of age.

TABLE VII.

AVERAGE DURATION OF INCAPACITATION.

I. Non-Operative.

(i.) UNDER 15 YEARS.

FRACTURE.	No. of cases in which period of incapacitation was stated.	Average number of weeks of incapacitation.	No. of cases in which incapacitation was permanent.
HUMERUS—			
Anatomical Neck / Upper Epiphysis	1	8	—
Surgical Neck / Shaft	23	10·5	—
Lower Epiphysis / Supra-condylic	48	13·5	—
RADIUS AND ULNA	73	17·1	—
COLLES'S FRACTURE	4	3·7	—
FEMUR—			
Neck / Upper Epiphysis	7	26·5	—
Shaft	196	13·5	—
Lower Extremity / Lower Epiphysis	8	18·2	—
TIBIA AND FIBULA—			
Shafts	219	12·8	1
Lower Epiphysis / Pott's Fracture	11	22·	—
Total	593	14·7	1

I. Non-Operative.

(ii.) OVER 15 YEARS.

FRACTURE.	No. of cases in which period of incapacitation was stated.	Average number of weeks of incapacitation.	No. of cases in which incapacitation was permanent.
HUMERUS—			
Anatomical Neck, Upper Epiphysis	5	5·2	1=20%
Shaft, Surgical Neck	70	27·6	7=10%
Lower Epiphysis, Supra-condylic	17	17·1	3=17%
RADIUS AND ULNA	64	20·6	4=6·2%
COLLES'S	34	17·1	5=14·7%
FEMUR—			
Neck, Upper Epiphysis	65	53·2	20=30·7%
Shaft	179	33·6	21=11·7%
Lower Epiphysis, Lower Extremity	8	18·7	2=25%
TIBIA AND FIBULA—			
Shafts	673	26·7	41=8·1%
Epiphysis, Pott's Fracture	209	23·7	17=8%
Totals	1,324	27·6	121=9·0%

II. Operative.

(Class A.)

(i.) UNDER 15 YEARS.

FRACTURE.	No. of cases in which period of incapacitation was stated.	Average number of weeks of incapacitation.	No. of cases in which incapacitation was permanent.
HUMERUS—			
Surgical Neck, Shaft	1	23	—
Supra-condylic, Lower Epiphysis	4	8·7	—
ULNA AND RADIUS—			
Both Bones and Epiphysis	1	6	—
FEMUR—			
Shaft	4	16·2	—
TIBIA AND FIBULA—			
Shaft	3	9	—
Total	13	12·2	—

II. Operative.

(Class A.)

(ii.) OVER 15 YEARS.

FRACTURE.	No. of cases in which period of incapacitation was stated.	Average number of weeks of incapacitation.	No. of cases in which incapacitation was permanent.
HUMERUS—			
Anatomical Neck, Surgical Neck, Upper Epiphysis	1	8	—
Surgical Neck, Shaft	9	32·8	—
Supra-condylic, Lower Epiphysis	1	78	—
ULNA AND RADIUS			
Both Bones, Lower Epiphysis	25	19·4	2 = 8 %
COLLES'S	1	—	1 = 100 %
FEMUR—			
Shaft	2	52	—
FEMUR—			
Lower Extremity, Lower Epiphysis	1	26	—
TIBIA AND FIBULA—			
Shafts	22	31·2	2 = 9 %
Pott's and Lower Epiphysis	2	14·5	—
Total	64	27·3	5= 7·8 %

SUMMARY OF TABLE VII.

ALL FRACTURES OVER 15 YEARS OF AGE.

	No. of Cases.	Average duration of incapacitation.	No. of Cases in which incapacitation was permanent.
I. Non-operative	1,324	27·6	121 = 9·0 %
II. Operative	64	27·3	5=7·8 %

It is clear that some of the cases in Class B, and all of the cases in Class C are really failures of non-operative treatment, and might reasonably be included in the non-operative cases. For the sake of completeness the cases in Class C are tabulated in Table VIII.

In Table IX the cases in Class C are added to the non-operative, and the average duration of incapacitation given for these two classes.

TABLE VIII.

II. Operative.

(Class C.)

(ii.) OVER 15 YEARS.

FRACTURE.	No. of cases in which period of incapacitation was stated.	Average number of weeks of incapacitation.	No. of cases in which incapacitation was permanent.
HUMERUS	6	81·0	—
RADIUS AND ULNA	16	54·4	1=6·2%
COLLES	1	48·0	—
FEMUR—			
Shaft	9	71·2	4=44·4%
Lower extremity involving knee-joint and Lower Epiphysis	2	291·0	—
TIBIA AND FIBULA—			
Shafts		49·2	3=20·0%
POTT'S	2	208	—
Total	51	76·6	8=15·6%

TABLE IX.

AVERAGE DURATION OF INCAPACITATION.

All Fractures over 15, Non-Operative, and Operative Class C.

No. of cases.	Average duration of incapacitation—weeks.	No. of cases in which incapacitation was permanent.
1375	29·3	129 = 10·0 %.

7.—FATAL CASES.

In Table X. is given the total number of cases of fractures of the long bones treated during the selected years, at the Hospitals in which cases were investigated.

From the following Hospitals statistics as to mortality rate were not obtained:—

Dublin—Adelaide Hospital, Mercer's Hospital. Glasgow—Victoria Infirmary. London—Metropolitan Hospital.

TABLE X.

	Hospital.	Cases Treated Non-operatively.		Cases Treated Operatively.	
		Recovered.	Died.	Recovered.	Died.
	1	576	7	13	0
	2	75	4	38	1
	3	1239	22	334	3
	4	100	2	51	1
	5	1459	8	121	0
	6	981	9	46	0
	7	4	0	50	0
	8	632	10	23	0
	9	149	0	17	0
	10	1359	14	69	1
	11	448	4	42	0
	12	89	2	12	0
	13	2234	7	32	1
	14	934	6	124	1
	15	1667	34	68	0
Totals ..	—	11946	129=1·0%	1040	8=0·77%

This Table shews that in 15 of the 19 Hospitals in which an investigation was held 11,946 fractures of the long bones were treated non-operatively, of which 129 had a fatal result, a mortality rate of 1·0 per cent.: the majority of deaths were due either to age, disease, or associated injuries.

1,040 cases were treated by operation, and of these a fatal result ensued in 8 cases, a mortality rate of 0·77 per cent.

The causes which in the non-operatively treated cases led to a fatal result, had a similar result in 5 of the cases treated operatively. The mortality rate, therefore, which may be attributed directly to operation is 0·3 per cent.

Among the operative cases there were three deaths directly attributable to the operation. These were due respectively to septicæmia (2 cases) and sepsis (1 case). According to the Hospital records the remainder were due either to existing organic disease (3 cases) or directly due to the anæsthetic (2 cases).

These two latter should not be attributed to operation, seeing that anæsthetics are employed so extensively in the non-operative treatment of fractures.

It is interesting to note that of the fatal operative cases, no less than 6 were operations undertaken after failure of non-operative treatment (Class C).

From which it is clear that the mortality rate of immediate operation (Class A) is exceedingly small.

Of the two fatal cases in Class A, one was that of a fractured femur associated with a ruptured femoral artery and a wounded femoral vein, in which gangrene resulted after a primary operation (wiring the femur) had been performed.

The second was a case of delayed chloroform poisoning, after an immediate operation for fracture of the humerus in a child.

APPENDICES.

APPENDIX (A).

(1)—ENQUIRY FORM.*

Case No.†.....

(†This No. will be filled in afterwards by the Committee.)

General result, defined as :—

	Good.	Moderate.	Bad.
Anatomical			
Functional			

BRITISH MEDICAL ASSOCIATION.

FRACTURES COMMITTEE.

[Private and Confidential.]

(1)
Bone .....

(2)
Treatment .....

Hospital at which treated (if any).....

Visit : Date .....191.....

Initials of Committee's Investigator .....

NOTE.—For meaning of Nos. (1), (2), (3), &c. see instructions to Investigators printed on separate sheet.

(Please write distinctly.)

Patient's Name.....

Address.....

Age.....years. Sex.....Occupation.....

(3)
Accident : Date.....19..... Nature of force.....

Fracture : Site.....

.....

(4)
Form .....

.....

(5)
Associated injuries.....

.....

.....

(6)
Treatment.....

.....weeks.

.....

.....

* With a view to saving space, the Enquiry Form used by the Committee is here reproduced in a diminished size, and not in the form in which actually used.

.....
.....
.....
.....

Duration of stay in Hospital.....weeks.

Duration of absence from work.....weeks.

Special circumstances influencing treatment and result(7).....
.....
.....
.....
.....

Skiagram :—Before treatment.....
After treatment.....

Results :

(A) Present condition of limb :
(*a*) Nature of Union.....
.....
(*b*) Deformity .....
.....
.....
(*c*) Movement of joints .....
.....
.....
(*d*) Mechanical or pathological changes in joints.....
.....
.....
(*e*) Swelling of soft parts .....
.....
(*f*) Circulation.....
.....
(*g*) Pain.....
.....
(*h*) Changes in muscles :—wasting.....
power.....
(*i*) Nerve phenomena.....
.....
(B) Present wage-earning capacity compared with former.....
.....
(C) If fatal, cause and date of death.....
.....

---

(2)—INSTRUCTIONS OF THE FRACTURES COMMITTEE AS TO THE DETAILED INVESTIGATION OF THE CASES.

(I.) General Instructions as to the Detailed Investigation of the Cases.

(*a*) The sole object of the enquiry is to determine the relative advantages of the operative and of the non-operative treatment of fractures.

(*b*) The scope of the enquiry is limited to simple complete fractures of the principal long bones, viz., femur, tibia, fibula, humerus, radius and ulna, and is to include simple separations of the epiphyses of these bones.

(*c*) It is proposed to draw conclusions from those cases only of which full details of the injury, of the treatment, and of the final result can be obtained. For convenience in the conduct of the enquiry, investigation will be limited to cases in which the accident causing the fracture has occurred, or in which an operation has been performed, within the Years 1906-10 inclusive.

(*d*) The Committee desires it to be understood that such material as is placed at its disposal will be used for statistical purposes only, and that no results will be published in such a way as to lead to the identification of the source of any particular contribution.

(II.) Special Instructions as to the Detailed Investigation of the Cases.

Summary of Total Cases treated within the Period 1906-10, inclusive (Form "(8)").

(*e*) The Investigator will please see that the Summary of total cases treated within the Period 1906-10 inclusive is filled in by the Surgical Registrar or House Surgeon (irrespective of whether there were, or were not, any cases fatal during treatment within the Period).

Remarks on filling up Enquiry Form (Form "(6.)")

(A specimen filled-up Enquiry Form is enclosed herewith. (Form "(7)."))

(*f*) It is particularly requested that all the spaces for answers be filled in, including summary of general result at top of front page of Inquiry Form. If in any instance information is not available, this fact should be stated.

(*g*) All statements embodying a judgment upon the final result of any given case are to be made only by the Investigator specially appointed by the Committee to report upon the case.

(*h*) The special Enquiry Form (marked "(6), Fatal case") should be filled in with reference to *every* case within the Period fatal during treatment, non-operative or operative. The Investigator will satisfy himself as to the cause of death in each such fatal case and enter it in the appropriate space on the front page of the Form.

(*i*) *Notes upon Headings in Enquiry Form.*

(1) (Bone).
Simultaneous fractures of different bones occurring in the same patient are to be reported on separate Forms, except in the case of double fractures commonly associated, viz: those of the tibia and fibula, or of the radius and ulna. State which side.

(2) (Treatment).
Non-operative, operative, or whether operation was undertaken after failure of non-operative treatment.

(3) (Nature of force).
Direct or indirect.

(4) (Form).
Single or multiple; comminuted or linear; transverse, oblique, spiral or T-shaped; free or impacted.

(5) (Associated injuries).

(*a*) Remote: any important lesion elsewhere, affecting treatment.

(*b*) Local: extensive bruising, injury to vessels, nerves or muscles: effusion into joints.

(6) (Treatment).
Nature, and duration in weeks, of each form of treatment used, should be stated.

(7) (Special circumstances influencing treatment and result).
Favourable or unfavourable temperament or physique; pre-existing or intercurrent disease. State reasons for choice of treatment.

(8) (Skiagram: before treatment, after treatment).
State whether the diagnosis, treatment and estimate of result have been controlled by X-rays.

APPENDIX (B).

(*a*) NON-OPERATIVE.

Fracture.....; **Sex**.....; **Age-Group**.....

No. of Enquiry Form.	Age (years.)	Complications.	Anatomical Result.			Functional Result.			Duration of Absence from Work (weeks).
			Good.	Mod.	Bad.	Good.	Mod.	Bad.	

(NOTE.—The actual form provided space for 20 cases).

		TOTALS							AVERAGE:

(*b*) OPERATIVE.

Fracture.....; **Sex**.....; **Age-Group**.....

No. of Enquiry Form.	Age (years.)	Complications.	Anatomical Result.			Functional Result.			Duration of Absence from Work (weeks).
			Good.	Mod.	Bad.	Good.	Mod.	Bad.	

(NOTE.—The actual form provided space for 20 cases).

		TOTALS							AVERAGE:

APPENDIX (C).

THE OPERATIVE TREATMENT OF FRACTURES.

PRÉCIS OF TECHNIQUE.

By MONS. A. LAMBOTTE, Antwerp.

(With Special Plate.)

The treatment of fractures ought to be guided by two fundamental rules:—

1. To renew the anatomical form of the fractured bone.
2. To move at once the articulations to avoid articular stiffness and atrophy.

The integral anatomical re-constitution is of the highest importance, especially in the adult, in whom the articular surfaces cannot be altered. A good functional condition can be observed with a marked notable deformity, but these cases are the exceptions, and it is unquestionable that the slightest alteration in the shape of the bone leads to definite functional symptoms or permanent pains. The usefulness of movement from the commencement is equally important and is admitted by everyone.

Operative treatment alone fulfils individually and conjointly both these indications in nearly all cases. Theoretically, any fracture being exactly and aseptically reduced ought to heal both readily and perfectly as a simple sub-periosteal fissure (greenstick); what practice confirms in all points.

The technique of osteosynthesis in recent fractures requires two principal points: Reduction and Fixation.

In old fractures these two are preceded by resection of the neck (osseous or fibrous) and the preparation of the ends.

To obtain correct apposition, it is absolutely necessary to possess an appropriate set of instruments. I employ for this operation a whole series of straight and bent forceps provided with teeth. I also utilise some spatulæ and various elevators. For the lower limb a traction apparatus, based on the principle of a lever, allows me to obtain traction of 150 kilogrammes with the hand.

Recent oblique fractures are reduced by longitudinal traction by means of forceps pulling the surfaces to the same level. Transverse fractures are more easily reduced by separating the ends whilst replacing the limb in position (angular replacement of the fragments). With a sufficient armamentarium the

No.	Date of Operation.	Sex and Age.	Lesions.	Operation.	
1	14th Aug., 1902	F. 30	Fracture ⅓ lower end of right femur, exterior over-riding, wound of the left leg, fracture of the left astragulus: bad powers of resistance, fat patient, weight 120 kilogrammes	Sub-cutaneous clamp, osteo-synthesis, with the secondary infection (the patient removed the dressing)	Death after many weeks of deep suppuration.
2	28th Jan., 1903	Girl. 6 days	Obstetrical fracture of the femur, subtrochanteric, enormous over-riding, irreducible	Suture with silver wire	Death from athrepsia on the 8th day; wound united without reaction.
3	25th Sept., 1905	M. 45. Worn-out. Alcoholic	Double fracture of the diaphysis of the femur	Osteo-synthesis with the clamp, six staples	Death 20 days later from multiple haemorrhages; wound in good condition, the lower fracture united, the upper slightly suppurating, Septicæmia (?).
4	May 28th, 1905	M. 45. Alcoholic scoriosis	Old fracture below the head of the femur (3 months), pains, and functional uselessness from pseudo-arthrosis	Reduction of the head of the femur	Death from acute pneumonia in 5 days.
5	July 5th, 1906	M. 18	Fracture of the diaphysis of the femur, transverse with over-riding	Osteo-synthesis with the clamp	Wound healed in 5 weeks. Fracture united. The patient walked with crutches. Sudden death from embolism (?). Nothing on autopsy.
6	Dec. 20th, 1906	F. 72	Fracture below the head of the femur	Screwing of the neck of the femur	Ordinary course for some days, then infection by wetting of the dressing by the urine. Suppuration. Secondary resection of the head and drainage. Death three months later from exhaustion.
7	March 5th, 1907	F. 74	Idem	Idem	Idem, death from slowsepticæmia.
8	Sept. 17th, 1910	M. 36	Old fracture of the femur (3 months) non-united	Reduction and clamp	Result, straightforward union, notwithstanding a slight suppuration. Six weeks later abdominal symptoms (appendicitis or peritonitis), evacuation of pus by the stools. Death from slow infection.
9	June 4th, 1908	M. 50. Cardiac, obese	Dislocation, fracture of the iliac bone (accident on the railway)	Wiring of the pubis	Slow infection and suppuration of the cavity of Retzius. Death in 4 weeks.

reduction, by ordinary manipulation, of *recent simple fractures* never presents any difficulty and always produces accurate apposition. The only difficulties occur with comminuted fractures. The technique of the reduction is here more difficult and varies according to the case; in principle, it is necessary always to endeavour to reduce and fix the intermediate fragment to one of the principal ends and thus change the comminuted fracture to a simple one which is then easily reduced. In old fractures of the diaphysis the difficulty of replacement varies; it is easy with transverse fractures by employing angular replacement; it is more difficult in oblique fractures, these require reduction by direct traction. Reduction obtained by ordinary manipulation ought nearly always to be maintained by *direct fixation*.

In certain jagged fractures, capable of impaction (tibia, radius, ulna) it is sometimes possible to dispense with fixation of the fragments, but these cases represent a minimum number of the fractures. Fixation can only be dispensed with with great caution, if one would avoid painful lack of success. The absence of direct fixation requires besides a fixation bandage which removes one part of the advantages of operation. In the femur and humerus, fixation is advisable in all cases, it is indispensable in all oblique and comminuted fractures.

The fixation apparatus ought to respond to the following conditions:—(a) It should be easily applied, (b) easily removed, and (c) the fragments should be sufficiently firmly fixed so as to dispense with a fixation bandage and permit the play of the neighbouring articulations. The majority of the apparatus recommended for fixation is bad and ought to be abandoned. After having experimented with a great number of them, I only employ two: the hoop and the screw.

The hoop consists of strong metallic wire (soft iron, copper) 1 to 2 mm., and constitutes the ideal method of fixation in oblique fractures of the diaphysis; it is necessary only to have recourse to it when the length of the line of the fracture is equal or superior to twice the diameter bone.

The screw is applied in three ways:—

1. Direct screwing of the fragments (epiphysis).
2. Screwing with plates (prothesis).
3. Screwing with external protector (clamp).

The latter is the best procedure for transverse fractures of the tibia; I have renounced its employment for fractures of the forearm, and it is only exceptionally that I have recourse to it in fractures of the humerus and femur. The thickness of the muscular masses of the arm and thigh lay the latter open to secondary infections.

Screwing with brass plates (prothesis) gives excellent results in the fore-arm, the humerus, and the femur.

Whatever the technique employed, the condition that ought to dominate the whole surgery of fractures is Asepsis. It is necessary to operate with a mask to avoid contamination with the air, and with gloves to avoid infection by contact. It is absolutely necessary to avoid all digital manœuvres in the wound and all contact of the skin with the materials used for the sutures. The preparation of the wound is of great importance; personally I only intervene 8-15 days after the accident (save for special indications). Before the operation I inject nucleinic acid (1.0 centigramme the night before the operation, 5 centigrammes the two days following): I have the impression that this treatment is useful.

In splintering of the bone it is necessary to refrain from extracting and sacrificing the loose fragments. In a third of the cases, above all in the tibia, I have made, more or less, extensive re-implantation of the fragments (once half the length of the fibia, once the internal third of the clavicle). The union of these fragments is certain if the wound remains aseptic. The reposition of the splinters is of great importance because the loss of substance which would result from their removal would be the cause of slowness of union or even pseudo-arthrosis. The danger of operative treatment is slight, if one operates under desirable conditions, it will become absolutely negligible when sufficient practice has been obtained in this branch of surgery. My statistics amount to 567 operations with nine deaths, 1½ per cent.

All the cases of death which I had to deplore concern fractures of the femur and pelvis. Some are not caused by osteo-synthesis. In three cases only septicæmia has followed osteo-synthesis with the clamp. This apparatus presents some danger to the femur. I have also employed it much less in fractures of the leg.

The other mishaps which are attributed to operative treatment are not well founded, when, as goes without saying, the operation has been correctly carried out. All the accidents with which one reproaches osteo-synthesis are only the consequences of infection. These infections are avoidable. They chiefly are produced in operations badly and slowly carried out, or the fragments are manipulated for too long a time. Asepsis in the surgery of fractures is only obtainable with a clean technique permitting of a quick and certain operation.

APPENDIX (D).

ANALYSIS OF CASES TREATED BY MONS. A. LAMBOTTE, OF ANTWERP, INVESTIGATED AT ANTWERP.

(Returns not received in time for inclusion in main Report.)

(All the cases belonged to Class A.)

LOWER EXTREMITY.

FRACTURE.	No. of Cases.	Good Anat. Good Funct.	Bad Anat. Bad Funct.	Mod. or Bad Anat. Good Funct.	Good Anat. Mod. or Bad Funct.
Femur	13	10	0	0	2
Tibia	5	4	0	1	0
Fibula	1	1	0	0	0
Tibia and Fibula.. ..	18	16	0	1	0
Pott's	1	1	0	0	0
TOTAL	38	32	0	2	2
		64·2%	—	5·2%	5·2%

UPPER EXTREMITY.

FRACTURE.	No. of Cases.	Good Anat. Good Funct.	Bad Anat. Bad Funct.	Mod. or Bad Anat. Good Funct.	Good Anat. Mod. or Bad Funct.
Humerus	14	8	0	2	2
Radius	1	1	0	0	0
Ulna	1	1	0	0	0
Ulna and Radius ..	5	2	0	0	1
TOTAL	21	12	0	2	3
		57·1%	—	9·5%	14.2%

TABLE IV.

No. of Cases.	Good Anat. Good Funct.	Bad Anat. Bad Funct.	Mod. or Bad Anat Good Funct.	Good Anat. Mod. or Bad Funct.
59	44	0	4	5
	74·5%	—	6·7%	8·4%

APPENDIX (E).

METHOD OF PROCEDURE IN OPERATIONS ON SIMPLE FRACTURES.

By MR. W. ARBUTHNOT LANE, M.S.Lond., F.R.C.S.Eng.

(With Special Plate.)

It is necesssary to take especial precaution to secure asepsis, for the reason that in these operations a foreign body of some considerable size is left in the wound and also because the soft structures are usually lacerated, bruised and inflamed and their resisting power to the entry of organisms is depreciated proportionately to the damage they have sustained. This is particularly the case in fractures produced by direct violence.

Previous to any operative treatment of fractures, satisfactory X-ray photographs of the injured parts are absolutely essential. They should be taken in at least two planes crossing one another at right angles in order that the operator should have the fullest information as to the nature of the fracture and the relationship of the fragments to one another. When it is impossible to obtain photographs in these two planes a stereoscopic arrangement often throws much light on the details required.

The skin should be thoroughly cleaned with ether, benzine, soap and water, and sterilized as far as possible by a suitable germicide. A useful method is to apply biniodide of mercury in methylated spirit first and then to employ tincture of iodine. How the cleaning is done is a detail, but if the epidermal layer is hard and thick it should be effectually removed by hot moist compresses and frequent scraping before any germicide is applied.

The plates used are of strong tough steel and should be carefully tested by the instrument makers before they are employed. Much discredit has arisen from the use of cheap plates which break either during or after the operation. There is no excuse whatever for the use of bad plates. In most cases the plate should be of toughened steel capable of being bent by powerful forceps in order that the plate should fit accurately a curved or variable surface. Sometimes, as in the case of old fractures with considerable overlapping of fragments a rigid plate is better as the bending strain it has to meet may be very great. The longer the plate and the greater the number of the screws the more secure is the hold of the plate on the fragments. It is necessary to have a considerable variety of plates to meet the special requirements of any particular case.

The screws are made up in several gauges and lengths. The gauges which are most useful are 3, 5 and 7, and the sizes $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ inch. They are so cut that the thread extends to the head, there being no barrel to the screw. The reason of this is that only the proximal layer of compact tissue is engaged by the screw, so doing away with an excess of metal and difficulty of finding the drill hole in the distal layer of compact bone.

There is very little variety in the details of the several fractures, and when the surgeon has acquired a familiarity with their treatment, he soon learns exactly what plate is most serviceable

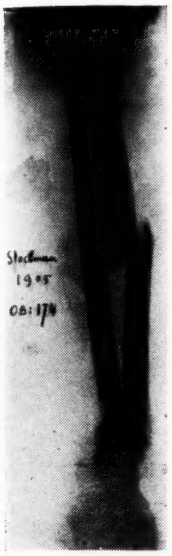
One thing that cannot be impressed too strongly on the surgeon is that he must restore the fragments accurately to their normal relationship before he fastens a plate on to them. The mere fixation of a plate to fragments not in accurate apposition is as foolish as it is painfully frequent at the present time, and the patient is worse than better for the operation even if sepsis is avoided, which unfortunately is too often not the case. The operation is very liable to fall into disrepute because of the incapacity of the operator. There is nothing wrong with the principle, the fault is in its application.

I endeavour to exclude the entry of organisms into the wound, and to minimise damage to soft parts by making an incision *of a length sufficient to allow of free and easy access to the seat of fracture.* The position and length of the incision is a matter of little concern in the case of fractures of the lower extremity, whereas in fractures of the bones of the arm much judgment may be required to avoid damage to nerves and muscles. A sterilised cloth is attached to each edge of the incision by specially constructed forceps in such a way that the surface of the skin of the patient is altogether excluded from view and consequently from the field of operation. All bleeding is controlled by the use of long forceps which are capable of exerting a pressure sufficient to obliterate the lumen of a vessel if left in position a reasonable time, so that it is never necessary to apply ligatures. These forceps, like all instruments used in these operations, are very long in order that the handles shall project beyond the wound area and not touch its surface. In this way the introduction into the wound of the gloved hand or any portion of an instrument which had come into contact with the glove is avoided. This is important since gloves are not absolutely reliable, partly because of the possible presence of punctures and partly because they are liable to be damaged by the use of the heavy instruments employed in these operations.

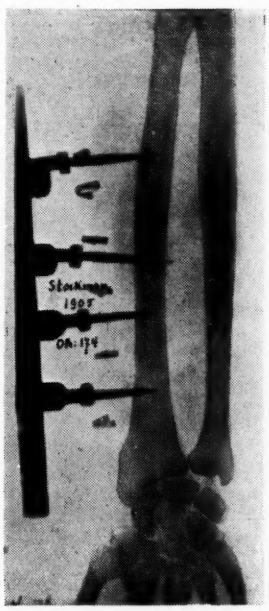
The ends of the broken bone are freely defined, the periosteum being divided and separated, if necessary. A length of each fragment is exposed sufficient to show the whole extent of the fracture and to carry plates long enough to retain the fragments immovably in accurate apposition.

Very little force is requisite to bring the fragments into accurate apposition if proper means be employed to do so. In the case of a fracture by direct injury where there is much

A. LAMBOTTE: OPERATIVE TREATMENT OF FRACTURES.



Fixateur (Lambotte).



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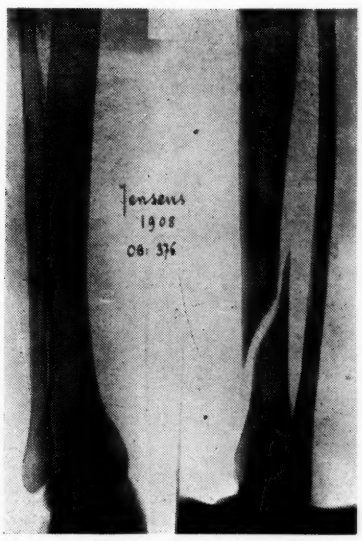
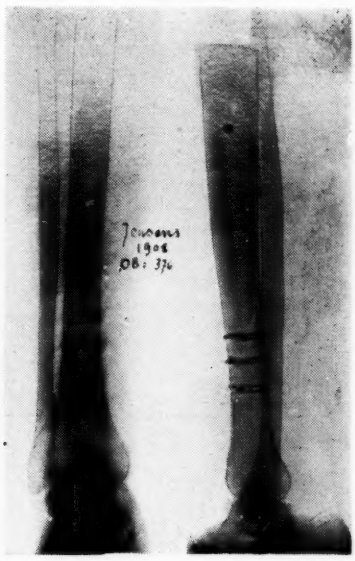
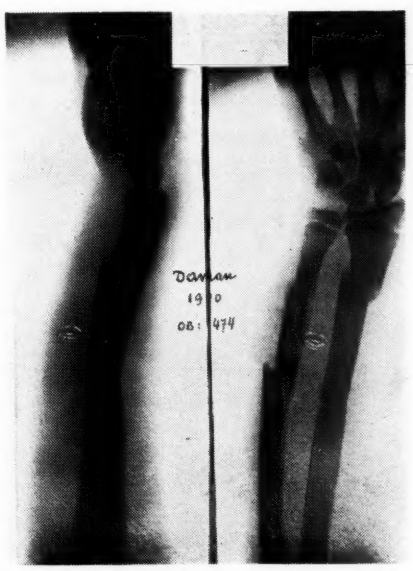


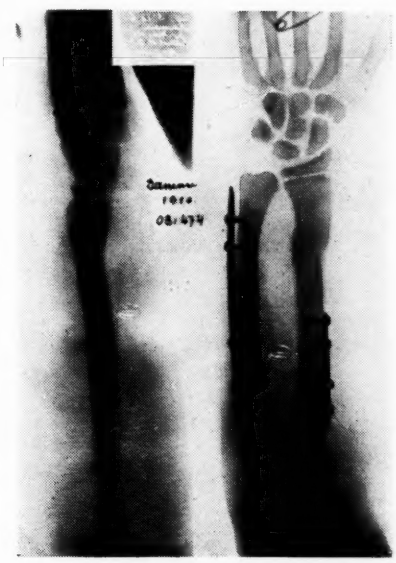
Cerclage (Lambotte).



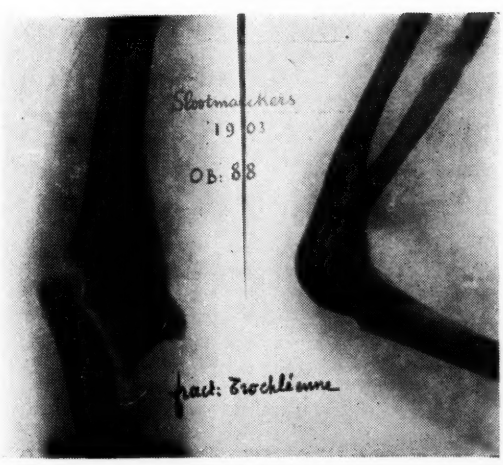
Cerclage (Lambotte)



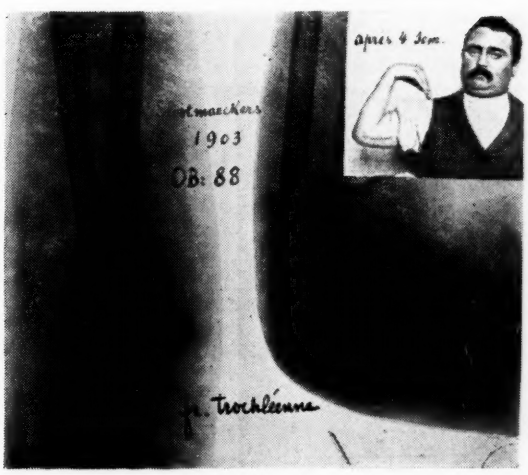
Plates (Lambotte).



Plates (Lambotte).

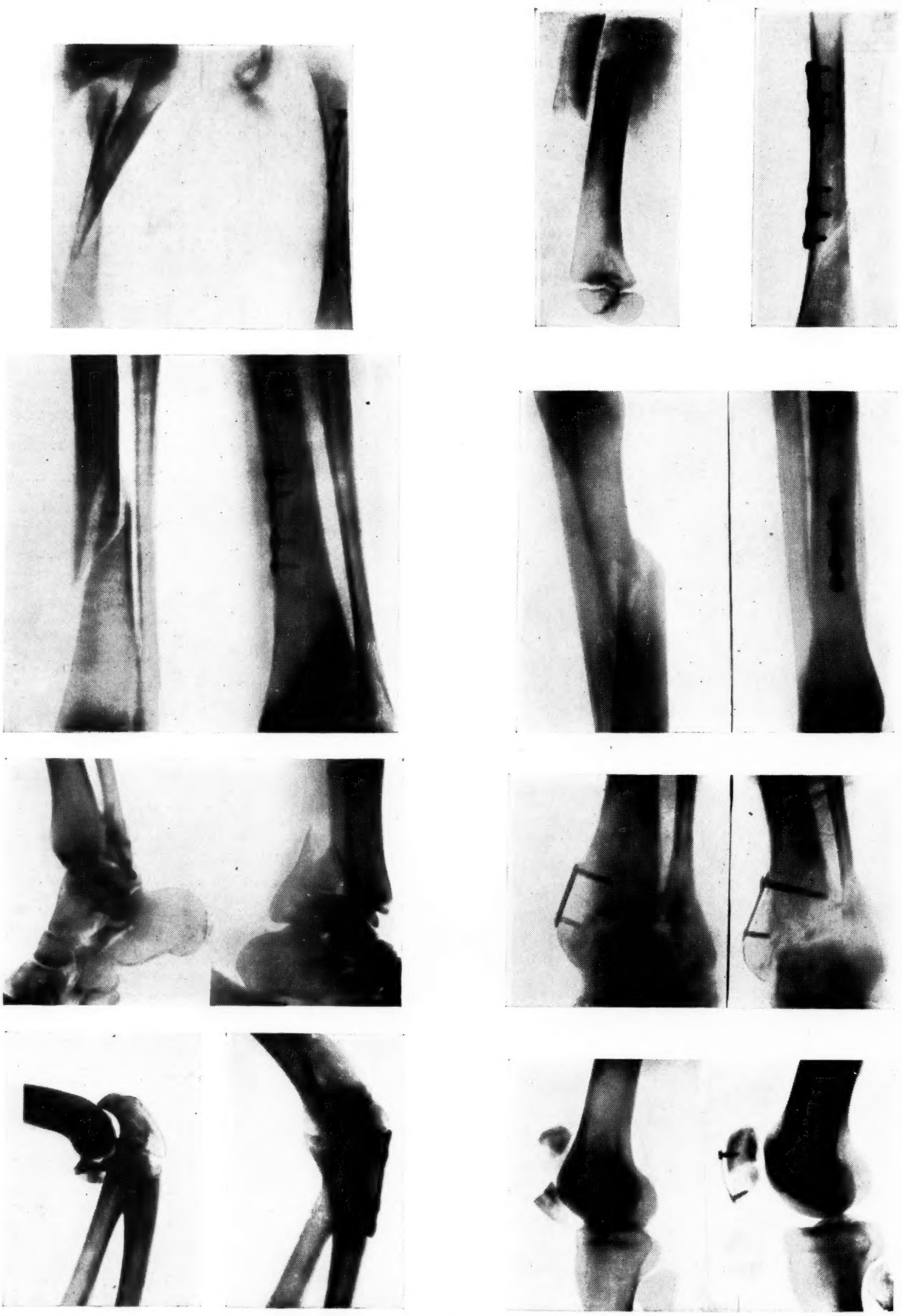


Screws (Lambotte).



Screws (Lambotte).

MR. ARBUTHNOT LANE: PROCEDURE IN OPERATIONS ON SIMPLE FRACTURES.



The photographs are taken before and after operation.

swelling and shortening of the soft parts which form ties in the length of the fractured bone producing considerable overlapping of fragments, a very great amount of traction may have to be exerted upon the fragments before they can be brought into accurate apposition, and during the exercise of this force the wound may become infected. If, on the other hand, the fragments are protruded at a converging angle beyond the wound, each in the grasp of a forceps, their ends may be easily coapted while extending the fragments on one another by straightening the limb beyond the fracture.

Also in the case of a fracture produced by torsion, where the fracture is spiral in character, the fragments may be moved on one another along a double inclined plane by the rotation of powerful forceps, which grasp them, aided sometimes by an elevator which being rotated between the surfaces approximated by the forceps moves them on each other with an irresistible power, the operator expending very little energy in the process. In other words, the accurate coaptation of fragments is brought about by the exercise of manual dexterity rather than by brute force.

If there is a comminution of the fragments the surgeon must meet the difficulty in the best way possible. It is usually effected by fixing a long steel plate securely to the lower fragment and then fastening to the end of that fragment the several smaller pieces in sequence by means of small plates and screws and subsequently securing the upper fragment to the stout steel plate.

(2) In old fractures, especially of the bones of the leg, in which it is important that shortening should be avoided, it is not necessary to cut bone away till large areas of the fragments can be brought into apposition, since a considerable interval left between the fragments will fill up with callus if the part be kept engorged with blood. This is best effected by getting the patient up on crutches, the limb being secured in an apparatus by means of which the weight of the body is transmitted through the tuber ischii to the ground. Except in the case of fracture of the femur I have not considered it advisable to bring the edges of the deep fascia together with sutures. This allows of the free diffusion of blood into the subcutaneous tissue, which picks it up rapidly. Michel's clips form the best medium for retaining the edges of the skin in accurate apposition. The coaptation of the skin edges may be the most difficult part of the operation because of the swelling of the soft parts. It is unwise to place a steel plate directly beneath the skin incision, and wherever possible it is well to bury the plate beneath muscle rather than immediately under the skin. If the latter is done, care should be taken to prevent any prominence of the screws or plate in order to avoid subsequent irritation. Should it be necessary to place a plate beneath the skin where it is liable to be pressed on by a heavy boot, etc., it is sometimes advisable to remove it when it has done its work.

Means should be adopted to prevent fixation of the joints by movements at regular intervals after the operation. This applies particularly to the knee-joint and to the several joints of the foot. The surgeon should bear in mind the necessity of obtaining this movement when he is operating and should not hesitate to put in a very strong plate or plates with enough screws to retain it in position with perfect security.

The only obstacles to operation are excessive comminution or such a fragile condition of the broken bone as renders it incapable of holding screws.

The photographs of cases taken before and after operation will afford the surgeon a better idea of the nature of fractures and the manner in which the fragments can and should be restored to their normal relationship more clearly than any amount of description.

June 22nd, 1912.

APPENDIX (F).

TREATMENT OF FRACTURES BY MASSAGE AND MOBILISATION.

SYNOPSIS OF THE METHOD.

By MONS. J. LUCAS-CHAMPIONNIÈRE, Paris, Member of the Institute.

My principles relative to the treatment of fractures by movement have been published for more than thirty years in numerous works:—through the Society of Surgery, in two large volumes; *Treatment of Fractures by Massage and Mobilisation*, in a bulky volume in 1895; *Summary of Treatment of Fractures by Massage and Mobilisation*, a small volume, in 1910; and *Treatise on Massage of the Limbs*, by Dagron, in 1905.

In English, numerous articles written by me have appeared in the BRITISH MEDICAL JOURNAL; and at New York, in the *Medical News* (January, 1900). I published an important article in the *Medical Annual* of 1909, and made a communication to the meeting of the British Medical Association at Sheffield in 1908. In the *Index of Treatment*, 1908, will be found an important article by Charles Cathcart. Finally, there appeared in 1911 an important volume by Mennel *On Massage and Mobilisation of Fractures*.

It would be premature to write afresh at much length upon the subject. The method, however, is sufficiently well known and established to make it useful to recapitulate its principal conditions by enumerating a series of aphorisms which should constantly guide the surgeon in his practice.

Aphorisms.

A certain amount of movement gives the best condition for the repair of the seats of fractures.

Absolute fixation of the fragments diminishes the production of the reparative elements.

Fixation of the limbs creates conditions which are disastrous to the vitality of the limbs.

It causes bony atrophy, stiffening of the joints and tendinous sheaths, stiffness of the muscles and muscular atrophy. The rapidity of production of these lesions is very great.

The more promptly movement is carried out after the accident the more perfect will be repair, at the same time there being avoided the complications resulting not only from the traumatism but from the traumatism complicated by fixation of the limb.

Fixation, which appears to allay pain, does not allay it permanently, but only temporarily. Immediately the least movement is attempted the pain due to the condition of the fragments and to the lesions of the soft parts caused by the traumatism will be complicated by pains which result from the lesions due to the fixation.

Mobilisation, and especially a certain variety of massage, produce a series of phenomena which are favourable to repair.

At first, anæsthesia, which ought to be the criterion of all treatment by massage.

This massage has immediate and multiple effects, of which the intimate mechanism is difficult to explain, but of which the elementary and physiological effects are easily verified.

Decrease, then disappearance, of pain.

Disappearance of muscular contractions. The result is disappearance of all the deformities resulting from these contractions.

Rapid absorption of blood and serum; disappearance of œdemas and swellings.

Stimulation of secretion of bone; rapidity and solidity of repair of the bone lesion.

Ease and completeness of repair of the torn membranes and muscles; prevention of stiffening and muscular atrophies.

The mode of action of massage is difficult to explain. It cannot be considered as merely the result of the squeezing out of the effused liquids and solids. If it were so, the more violent the massage the more beneficial it would be, while, in fact, its violence precludes almost entirely any benefit from its use.

Its mode of action appears to be extremely complex. It seems to act at one and the same time upon the peripheral nerve endings and upon all the constituent elements of the limb, on which it exercises a direct action.

It must always be practised from the periphery to the centre, that is to say, from the extremities of the limbs towards the centre, in an ascending direction.

It must include an area much more extensive than merely the actual site of the lesion.

Like all anæsthetising or soporific movements of the mesmerist, it must never change its direction. Any pressure the wrong way is productive of pain, in place of giving relief.

Its action is the more favourable the nearer it is employed to the actual time of the traumatism. The longer the pain of the fracture and the contractions have lasted the more difficult will it be to obtain the beneficent effect of the massage.

To obtain such effect in the maximum degree, there must always be observed a graduation which it is impossible to neglect.

Superficial pressures, having almost the form of caresses, should be used at the commencement of all massage, and ought, at the commencement of each future reapplication, to precede the deep pressures and prepare the way for these.

Any recurrence of pain in the course of treatment, or recurrence of pain in the course of the massage itself, calls for a return to superficial pressures.

When massage is associated with mobilisation, mobilisation should not be carried out except after the massage séance. If mobilisation is painful, massage should be resumed before carrying out mobilisation.

For massage, as for mobilisation, it is necessary emphatically to insist upon the important point that "commencement of movement should be as near as possible to the actual time at which the fracture has been produced." Secondary massage and mobilisation are not at all productive of all the benefits secured by immediate movement. Thus, to concede that massage shall be used from the second or third week after the traumatism is entirely to fail to appreciate the method. Such a procedure is a failure to understand the efficacy of the method, and makes certain of its good effect not being obtained. Such a mode of treatment can be advised only by a surgeon who has not understood the mode of action of immediate movement. Even such belated intervention is better than persistent fixation. But this is not the method which we have advocated.

Mobilisation of the limb is not at all the complete re-establishment of the amplitude of its ordinary movements. That amplitude is not directly sought in the manœuvres which accompany and follow bone and joint repair.

The surgeon should aim at the totality, the multiplicity of the movements, *but by degrees*. This multiplicity of movements restricted in their range entirely suffices for the future of the repair. A practice which consists in making as soon as possible the most extensive possible movements is calamitous in the large majority of cases.

Progression in the amplitude of the movements of mobilisation ought to be very slow at first.

Mobilisation should consist at first of passive movements, then of active movements.

As a general rule these active movements should be methodical, carefully-watched, gymnastic movements.

In certain rare circumstances the active movements can from the commencement be functional movements. But this is not the best condition.

As the time of the accident becomes more remote, the functional movements play a more important part in the return of function. But, in many circumstances, they should be carefully directed by the surgeon, who should indicate to the patient which are the movements to avoid and which are those to aim at.

In principle, all fractures can benefit from graduated movement.

In practice, certain fractures urgently require it, and are in fact properly treated only if such movement is carried out. These are, all fractures involving, or in the neighbourhood of, joints.

Only very young subjects can hope for complete restoration after fixation of the sites of articular fractures.

Fractures of the upper extremity of the humerus, fractures of the shoulder in general, fractures of the elbow, fractures of the wrist, fractures in the neighbourhood of the tibio-tarsal joint, fractures of the upper extremity of the femur, these articular fractures derive from the method such a result that their prognosis and treatment are transformed, and that these fractures, formerly very grave in their consequences, can become accidents without importance and without resulting functional alteration.

Certain fractures of the continuity of the bones accompanied by important contractions are amenable to this treatment. Such are the fractures of the clavicle and certain fractures of the humerus.

But the simplest fractures of the continuity of the long bones can, in a great number of cases, benefit by the method, which we have often applied to the middle of the humerus or the middle of the leg.

Experience has shown me the but slight importance, from the point of view of function, of a moderate shortening. I have even been able to demonstrate that this shortening may play a useful part in the phenomena of muscular repair. Thus it is necessary that the surgeon should cease to have in the first rank of his preoccupations the question of shortening and of the complete re-establishment of the length and form of the bone.

One single class of deformity is truly interesting, for the remedy has to cause there, deviation from the axis, even if little marked.

But it must be noted that, thanks to the early disappearance of muscular contractions, these deviations of axis are extremely rare.

If at the time of breaking or impaction the deformity is only a deformity of shortening or of deviation not interfering with function, it creates a circumstance felicitous as regards repair, which will be more rapid and more solid. It is a fortunate condition which should be respected. Forced reduction should be avoided. This is the case of the majority of fractures of the upper extremity of the humerus, of the greater number of fractures of the radius, and of most fractures of the neck of the femur.

The beneficent action of movement on the fractured limb is not only apparent in perfection of function. The first effect appreciated by the patient is the disappearance of pain. Very painful fractures, like those of the shoulder, the elbow, and the neighbourhood of the tibio-tarsus, are a remarkable example of this.

Rapidity of bony repair is abundantly demonstrated.

Solidity of the limb is obtained far more quickly than by means of fixation.

The stimulating effect of massage and movement in the development of callus even requires to be watched. In very young subjects, who secrete bone readily, it should be avoided, in order not to cause formation of excessive callus. Thus, as a principle, infants should not be massaged.

They, however, tolerate very well mobilisation without massage. In their case, massage should be reduced to a sort of superficial caress which suffices for the anæsthetisation of the part.

In all cases, and in conclusion, it must be noted that in this modern treatment of fractures the action of the surgeon by immediate mobilisation and massage is so powerful that it is necessary to watch it closely.

It is certainly of a more delicate application than the treatment by fixation. But its results are so superior to anything that can be achieved by fixation that it should become as generally used as possible.

So applied, it will reduce to an infinitesimal proportion the cases of fractures of which the habitually bad functional results have led surgeons to recommend immediate cutting down upon the seat of fracture. Operations can be had recourse to only in the quite exceptional cases in which the surgeon is reduced to absolute fixation by an insuperable tendency to deformity.

APPENDIX (G).

NAIL EXTENSION FOR FRACTURES.

ACCOUNT OF THE METHOD.

By Dr. F. STEINMANN, Privatdozent der Chirurgie, Bern.

The method of "nail extension" as put forward by me in a publication in the year 1907, is based upon the same principles as is that of continuous adhesive plaster extension, and will, along with the latter method, lead the way in the struggle towards the realisation of a treatment of fractures which aims at a combined anatomical and functional recovery, and by so doing alone makes ideal results possible. Every practitioner will agree with me that in a whole series of fractures he has not attained his object by adhesive plaster extension, because he could not exert a sufficiently strong pull. In these cases nothing remains to him but nail extension, that is to say, a method which exercises a continuous pull, as far as possible directly on to the peripheral fragment, exclusively by means of nails which are driven into or through the bones. (Fig. 1.)

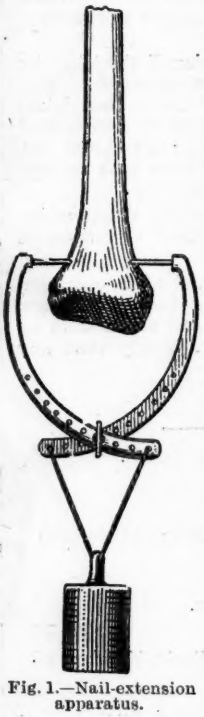


Fig. 1.—Nail-extension apparatus.

The technique which I have found in the course of years to be the best is extraordinarily simple. It is as follows: A nail with a pointed, four-sided end, is bored through the lower end of the peripheral fragment and the extension is fastened to the projecting ends of the nail. The length of the nail chosen is determined by the thickness of the limb at the place of insertion, and the nail, together with a pincette or forceps, is sterilized by boiling, it is then seized by the forceps and its posterior end which, like the other, is four-sided, is fixed into a hand drill. The nail is now pushed in down to the bone at a spot which has been previously decided upon and disinfected, as for example, by painting with iodine; next it is bored through the bone until the point perforates the skin on the other side and

the ends of the needle project equally on both sides. The process of boring can be carried out either by means of the drill attached to the nail or of Doyen's trephine or by electricity. Driving the nail through the bone with a hammer is to be avoided because of the shaking of the site of fracture, as also any preliminary incision or even a preliminary boring of the track for the nail through the bone. If the soft parts are thick

g. 2.—Positions for insertion of nails (femur and tibia).

it is a good thing to draw the skin in the proximal direction in order to avoid cutting the skin with the nail loaded with the extension apparatus.

Anæsthesia for the driving through of the nail may be carried out by a short narcosis, but very easily also by local anæsthesia. After the driving through of the nail the sites of exit and entry are covered with antiseptic gauze and a thoroughly sterile bandage; the projecting ends of the nail are thus kept free from germs to a considerable distance, so that should the nail become loose and slide to and fro only sterile parts will enter the nail track. The bandage must in any case protect the nail region from the prying fingers of the patient.

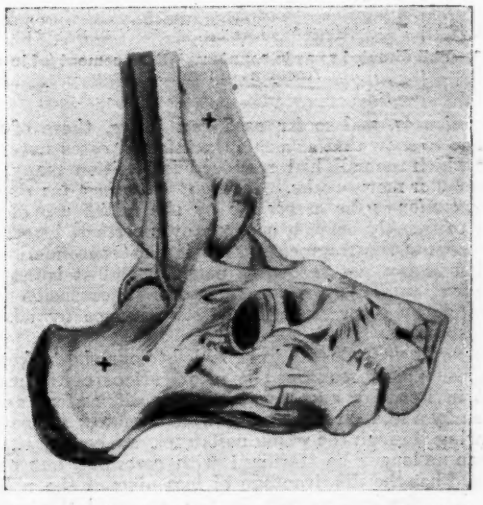


Fig. 3.—Positions for insertion of nails (lower end of tibia, os calcis).

In choosing the place for insertion of the nail we must take into consideration: First, that the nail must be altogether outside the fracture hæmatoma so that no infection takes place along the nail. To insure this in the case of fractures of the lower half of the femur we infringe upon the principle of direct attack upon the lower fragment, and insert the nail into the head of the tibia, and similarly in fractures of the lower half of the leg we drive the nail through the calcaneus. Secondly, we must avoid the medullary canal in order that, if the nail should become infected, osteomylitis may not result. Further, we avoid the joint capsule, because of the danger of joint infection. Finally, we spare the line of the epiphysis, although I have seen cases in which this was injured years before with absolutely no visible harmful effects.

From these considerations we have found the following to be the most suitable positions for insertion of nails:

One at the lower end of the femur immediately above the condyles, a second at the tibia about 2½ fingers' breadth below

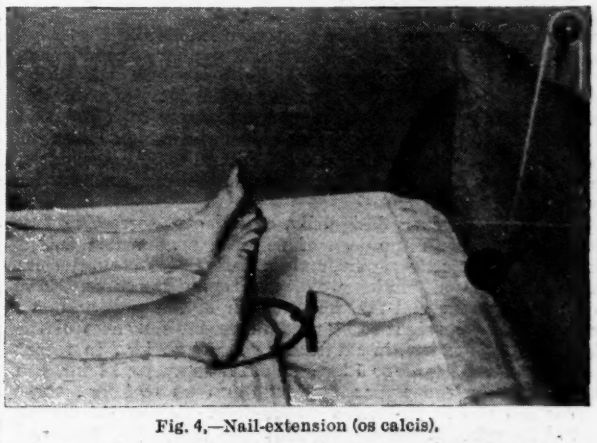


Fig. 4.—Nail-extension (os calcis).

the line of the knee joint (Fig. 2), so that the outer half of the nail comes to lie in front of the lower end of the styloid process of the fibula; another at the lower end of the tibia about two fingers' breadth above the line of the ankle (Fig. 3), so that the outer half of the needle passes in front of the upper end of the external malleolus; another at the os calcis 1½—2 fingers' breadth obliquely backwards and downwards from the tip of the external

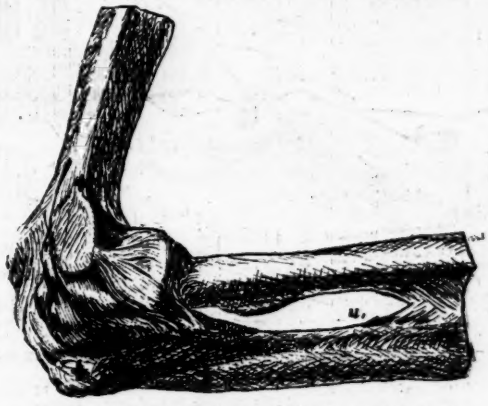


Fig. 5.—Sites of selection (three) for upper arm.

malleolus, that is, at the junction of the upper and middle thirds of the line of union of the corpus and tuber calcanei.

For the upper arm the site of selection lies at the lower end of the humerus immediately above the condyles, or better, in the olecranon, or even perhaps somewhat further towards the periphery in the upper end of the ulna (Fig. 5). For the extension of fractures of the elbow and forearm, the site is on

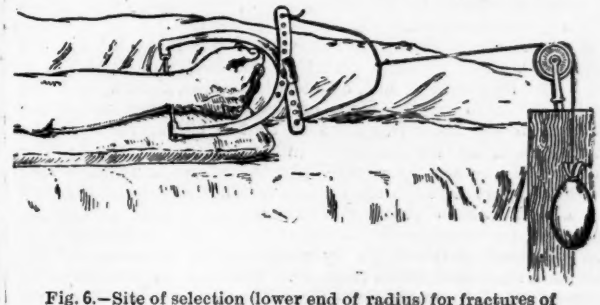


Fig. 6.—Site of selection (lower end of radius) for fractures of elbow and forearm.

the lower end of the radius, which is bored through about two fingers' breadth above the wrist joint from the dorsal side (Fig. 6). The thickness of the nail used should be from 3-5 mm.; its length varies with the thickness of the limb and must exceed it by a few centimetres. The upper ends of the two branches of my extension apparatus* are fastened over the

* Manufactured by Sanitatsgeshaft Schaerer A. J., Berne.

projecting ends of the nail, and the branches are fixed against one another in the right position by means of the wing screw which fastens together the two holes falling on one another. The extension grasps the lower ends of the branches on both sides (Fig. 7).

In carrying out nail extension, the great advantages of the method as compared with that of adhesive plaster extension at once become apparent. Nail extension allows us complete freedom as to the position of the extended limb. For thigh and leg fractures we may make use of Zuppinger's semiflexion, as we ourselves have done from the beginning. A second advantage is the possibility of giving to the force of extension any strength we wish. We ought not however to forget that the same weight acts much more strongly in nail extension than in adhesive plaster extension. Failure to take account of this stronger action led, earlier on, to unintentional considerable over-corrections.

I make use however, designedly, of such over-correction, first to make possible re-position of the fragments when this is hindered by projecting spurs, and secondly to combat injurious shortening especially in long, oblique or spiral fractures. There is no absolute normal for the strength of the pull and if I suggest that the weight to be used in recent fractures of the thigh is from 3-12 kg., in old fractures up to 25 kg., in recent fractures of the leg up to 5 kg., in old ones up to 12 kg. and in fractures of the upper and fore arm up to 4 kg., these figures are not to be taken as binding. We must always control the effect of the extension by the measuring tape and possibly by Röntgen rays and modify the extension according to the result. I do not need to enter upon the question of

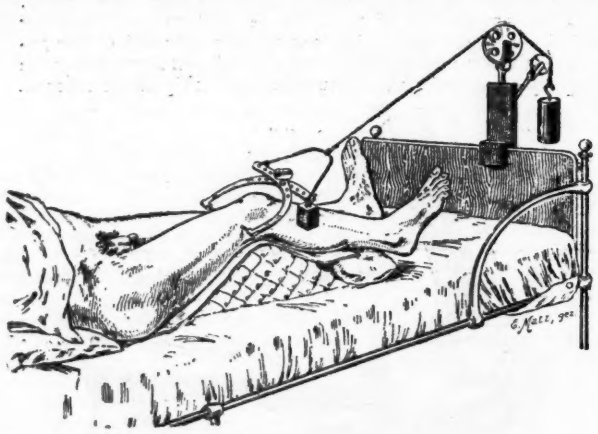


Fig. 7.—The two branches of the apparatus, and wing screw and attachment of weight.

counter extension, since this presents absolutely no difficulty, and in all my cases I have found it sufficient to raise the lower end of the bed.

Nail extension has been the cause of the greatest surprise to surgeons through its comparative painlessness. I have been able to treat a whole series of patients by this method without their knowledge, and although a certain number of patients may complain of pain for a short time, this pain is certainly not greater and, according to my experience, is decidedly less than in strong extension by adhesive plaster; it certainly does not in any way contra-indicate the use of the method.

A great help to the right reposition of the fragments is the fact that we can give any direction we wish to the pull. If the upper fragment is not, as often happens, drawn into the axis of the limb by the force of the pull, we can adopt the position of the lower fragment to that of the upper with the utmost ease, as for example in fractures of the upper third of the femur by a pull directed strongly upwards and outwards; but through the change in the direction of the pull we also influence sideways dislocation of the peripheral fragment, for example displacement to the back in fractures of the lower part of the thigh by carrying the direction of the pull somewhat backwards (Fig. 8). Sideways displacement of the peripheral fragment is corrected by transferring the pull more on to one end of the nail than the other, that is, more on one side of the apparatus, displacement ad peripheriam by hanging a weight on the one end of the nail, *i.e.*, on one side of the apparatus (Fig. 7). An advantage of this method of reposition as compared with that of Bardenheuer's side extensions, which is also at our disposal, is that in this the freedom of the limb is not affected, and the fracture region is left open to observation. A further great advantage of the method is that it requires only two points for its application, and for the rest leaves the whole limb free for early functional treatment. We can begin forthwith with massage and electrical treatment of the muscles, together with passive and active joint movements. Nail extension better meets the requirements of early functional treatment than does any other extension method.

One disadvantage, however, stands over against these great advantages, that is, the danger of infection. This is undoubtedly the black side of nail extension. If the treatment is carried out according to my technique, no mishap ought to occur. Yet in a number of cases there have occurred in connection with the nail spots, delay in healing, decubital ulcers, abcesses, and obstinate fistulæ. I myself, out of nearly 40 cases of nail extension, have had one fistula of about three months' duration, and one of over a year, while in the remainder, the nail sites were healed after a few days or weeks. We must, then, direct all our efforts to combating this dark side of the method. For this purpose is needed in the first place an absolutely complete asepsis. I have always emphasized that doctors who are not willing to carry this out in the most rigorous fashion would do better to abandon the method. But this careful asepsis should not only be observed during the passage of the needle itself, but also during the whole duration of extension, and after the removal of the nail should be directed to the holes left by it. We may be still doubtful whether the use of a needle in two parts (though we have as yet no usable model of this), or whether certain protective coverings, etc., will be found helpful in the fight against infection. But in any case one point plays a very important *rôle* in infection of the nail canal, and up to the present has received too little attention, that is the *duration of the extension.*

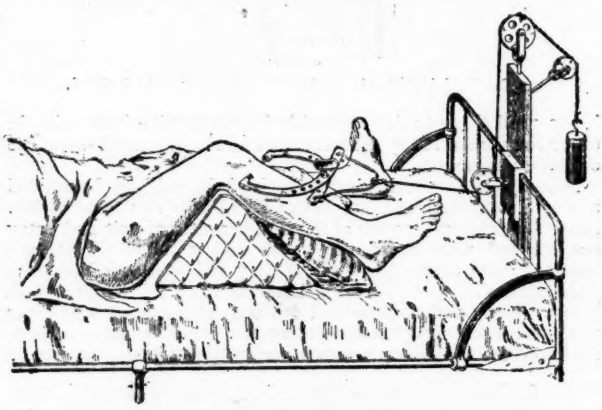


Fig. 8.—Pull directed so as to counteract displacement (of lower fragment of femur).

Our experiences, and so far as I can judge, those of other authors go to show that as a rule the infected cases have been those in which the nail had remained in position many, that is to say 5-8 or more weeks. *We must thus limit the duration of nail extension as far as possible* by the initial use of large weights to quickly correct, or even over correct, lengthways displacement of the fragments, and, if any consolidation has set in, but in any case as soon as possible, and at latest after three to four weeks, by removal of the nail extension or by replacing it by other methods, as for instance by adhesive plaster extension.

There ought undoubtedly to be added to our short sketch of nail extension an account of the modifications of the method brought in by other authors and by myself, as for example, extension by a nail on both sides which renders unnecessary the drawing through the whole nail track an end of the nail which can no longer be sterilized with certainty, but on the other hand has the disadvantage of loosening of the nail. A further modification consists in the so-called "splint nail extension," which is used for fractures of the leg especially in France, and which develops the extending force between one nail perforating the metaphysis of the upper fragment and one perforating that of the lower fragment. Although the method may fix the fractured segments of the limb more firmly, it is on the other hand more complicated, it diminishes access to the fractured spot, and what is of greatest importance it doubles the danger of infection. My recently published monograph "Die Nagel extension der Knochenbruche*" is at the disposal of those who wish to inform themselves as to all the forms of use of nail extension and their exact technique.

* Dr. Steinmann. Die Nagelextension der Knochenbruche. Neue Deutsche Chirurgie I., Bd., 1912 bei Enke, Verlag, Stuttgart.

And now with regard to the indications for the use of nail extension. I do not attempt to maintain that my method should replace that of adhesive plaster extension. Where we succeed with the latter and are in a position by means of it actually to bring about reposition then plaster extension is the method of choice. But experience has shown there to be a whole series of different fractures in which the doctor fails to accomplish his object by the above method; these cases are naturally less numerous for those technically perfected in the method of adhesive plaster extension than for the majority of surgeons. We must, however, reckon with the latter. Among recent fractures, complicated ones are especially the ones which often do not admit of adhesive plaster extension, and which, therefore, up to now have often given miserable results. These are some of the most satisfactory cases treated by nail extension which, along with adequate extension, permits of unhindered access to the complicating wound and therefore of a rational treatment. But there are a large number of uncomplicated fractures in which, up to now, inadequate and bad results have been obtained with plaster extension and in which nail extension is able to do good service.

I agree with Körber, who till now has worked up the greatest material in nail extension cases and has done so very critically that nail extension is indicated for the lower limb in :—(1) Fractures of the upper third of the femur with a short upper fragment displaced to the front and outwards; (2) Dislocated transverse fractures of the middle third of the femur in which reposition is a matter of difficulty; (3) Fractures of the lower third of the femur with obstinate dislocation of the lower fragment backwards; (4) Knee joint fractures, especially if the diaphysis is driven into the epiphysis; (5) Fractures of the lower half of the leg with dislocation, not easily reducible, of the proximal fragment to the front; (6) Supra malleolar or malleolar fractures with much displacement.

Of upper arm fractures, according to Wilm, fractures of the lower end of the humerus are to be submitted to nail extension, and this also can well be applied to obstinate fractures of the forearm.

Nail extension has also been held to be specially indicated for comminuted, double, and multiple, fractures.

In addition to a complicating wound, other factors such as smallness of the available surface for attaching adhesive plaster, injuries of the skin, obesity, &c., may make plaster extension impossible, and forces us to have recourse to nail extension.

Perhaps the type of fracture which best rewards nail extension is that of old fractures, specially those in which as a result of accidental wound diseases or intercurrent illness or unfavourable complications such as eczema, decubitus, gangrene, &c., the methods first tried, as for instance adhesive plaster extension, either failed or could not be carried to a termination. Here nail extension, with its strength of action can still, after some weeks, remedy what has been neglected. Similarly nail extension may be expected to play a great *rôle* in war. When shot fractures reach the terminal hospital after many days or weeks, only nail extension will usually be adequate to make good the displacements and shortenings which have occurred. In recognition of this the Prussian army has incorporated my instrumentarium in its medical outfit for war. Nail extension has quite especially conquered for surgery the territory of old fractures which have healed with great deformity and shortening, inasmuch as in these, after a second artificial fracture, it has made good shortenings of many cm., even up to 11, 12 or 13 cm. With the method—as Kirschner says—we can undertake tasks hitherto impossible.

Nail extension is also used for the correction of other forms of shortenings of the limbs, as after scalariform sawing of the bones, further in the re-position of old luxations, in the treatment of coxa vara (Sprengel), in the mobilization of stiffened joints (Payr), and even for the correction of club foot. The method is so new that obviously the region for its employment is still not sharply defined. My purpose has been specially that of shewing you that in cases of fracture in which other methods fail, you no longer, as formerly, stand helpless, but have a method to fall back upon which can do good service under the most difficult conditions, and can even make good the unsatisfactory results of other methods.

APPENDIX (H.)

(1) THE TREATMENT OF FRACTURES WITH EXTENSION BANDAGES; AND THE RESULTS OBTAINED THEREBY.

By GEHEIMRAT PROF. Dr. BARDENHEUER, and STABSARZT Dr. GRÄFSNER, of Cologne.

(From Publication in honour of the Opening of the School for Practical Medicine in Cologne, compiled by Prof. Bardenheuer, 1904, pp. 113-128.)

Perhaps there is no joint fracture in which an error on the part of the doctor treating it is so severely avenged as ankle-joint fracture, whether the error is one of diaguosis in looking upon fractures as distortions and treating them as such or of failure in treatment after a right diagnosis of fracture. Either the doctor immobilizes the injured joint too long and causes subsequent stiffness or he allows the foot to be used too early, so that deformities occur and cannot afterwards be removed. In either case function is and as a rule remains considerably impaired. Every doctor who has many cases of accident to report on knows how great these injuries often are. But even in those cases of ankle fractures which had been treated in large hospitals and in the treatment of which the right proportion of immobilization, movements and rest in bed, had been maintained, we found misplacements and inflammations which considerably affected the power of making a living. The treatment had always consisted in fixation of the foot in a containing bandage (usually a plaster bandage), so that we must acknowledge to ourselves that these bandages are not always in a position to remedy displacements and to prevent the harmful results of a joint fracture. We would, however, maintain that the extension bandages, as Bardenheuer has made use of them in the Cologne Municipal Hospital for the last twenty years, have not failed us in any fractures, not even in ankle fractures, and that, rightly used, good results will be obtained throughout.

When Bardenheuer's assistants reported on the results of extension treatment in ankle fractures—Loew (*Deutsche Zeitschrift für Chirurgie*, Bd. 44: on the results of fractures of the leg in respect of the accident insurance law) and Bliesener (the same journal, Bd. 55: on the functional results obtained through Bardenheuer's extension method in fractures of the lower limbs), their results were described by the one as fabulous, by the other as ideal. That these have been equally good also in the following years (1897—1903) should be made manifest in the following article. But first the method of carrying out Bardenheuer's extension must be shortly described. Bardenheur has expressed himself more fully on the subject of extension in his text books, in the 1903 volume of the discussions in the German Society for Orthopædic Surgery, and finally in a larger work in the *Archives Internationales de Chirurgie*.

For a satisfactory carrying out of extension, beds are needed with a hard substratum, preferably a mattress, since the extended leg is not laid, as in the usual treatment, in a splint, but lies directly on the bed. It is desirable for the beds to be long: for hospitals we recommend beds of 2·4 m. in length and 0·85 m. in breadth. Further, a thoroughly adhesive non-irritant plaster is necessary, Formerly, in using the customary grey canvas adhesive plaster the onset of eczema often made it necessary to remove the bandage, and rendered the result of treatment a matter of doubt. Since we have used collemplastrum zinci on grey canvas (Helfenberg Chemical Works) and leukoplast (Beiersdorf), we have not again seen eczema occur even in this hot summer. We fasten the adhesive plaster strips, which are laid on the unshaved skin, by circular overlapping turns of perforated mild indiarubber plaster, 3 cm. in width. The adhesive power of this plaster is so strong that a length extension on the leg can be forthwith weighted with 25 kg. without disturbing the plaster.

As is known, Bardenheuer not only seeks to make good the dislocatio ad longtitudinem by a pull lengthways, but also the dislocatio ad axim, ad latus, ad peripheriam through transverse and rotation pulls.

To apply lengthways extension to the lower limb, the malleoli and the anterior border of the tibia are first protected by strips of gauze, evenly laid on, and the strip of adhesive plaster then carried downwards on the outer side of the leg from behind the trochanter. The plaster forms a stirrup under the sole and goes up again on the inner side of the leg. These strips are made firm, as was stated above, by circular turns of

perforated adhesive plaster. The knee joint, however (as indeed all joints), and the thigh for four fingers' breadth above the knee joint are left free; the former in order not to injure the joint movements, the latter, in order that in any possible yielding of the circular turns of plaster, the knee joint shall not be compressed and its circulation interfered with. In fractures of the malleoli, and of the lower third of the leg, however, we carry the circular turns to the ankle in order to be able to exert an effect on the lower fragment. This effect will be strengthened if we sew up the loop of adhesive plaster close in front of the sole, or insert into it a buckle (like the buckle of braces). In loading the extension, a strong pull will be exercised on the malleoli and "spring" joint; the foot can be carried either outwards or inwards. It is often considered doubtful whether the skin surface, and therefore the surface for attack by adhesive plaster strips in supra-malleolar or malleolar fractures is not so small that the lower fragment cannot be influenced. The two Röntgenograms I. and II. should contradict this view.* This pull upon the lower fragment is however of great advantage especially in the treatment of malleolar fractures, since through it, the hinder part of the foot can be brought into the right position. This position is not always obtained by putting the foot into plaster of Paris; the foot certainly is supinated at Chopart's joint but without the deformity at the malleoli being corrected by the displacements in the talocrural joint. With the extension bandage by which the position of the whole foot including its posterior part is kept under lasting control this defect can always be avoided. As we have already said, the extension bandage is applied far above the seat of the fracture. This is often a cause of surprise. But, as Bardenheuer's experiments on the recent body have shown, it is a mistake to think that the action of the pull is thereby affected. The adhesive plaster strip reaching up above the seat of fracture is not so much made fast to the bone as to the movable soft parts. The characteristic force of extension, however, acts chiefly on the parts of bone lying peripherally from the fracture and finds in these its special areas of attack, acting through the long strips which are pressed in by the circular turns of bandage. In this way only is it possible for us in a number of fractures to apply the necessary weight. Counter extension is effected by raising the foot end of the bed.

In all malleolar fractures we bring the length extension of the foot upwards (towards the toes, the ceiling) with a weight on an average of 1 kg. By this pull pressure is taken off from the heel and in addition it keeps the lower fragment more safely in position and prevents turning in of the toes. In ankle fractures which are to be put into a position of marked supination it serves as a substitute for the rotation strips which we formerly used. An adhesive plaster strip is applied to the dorsum and sole of the foot so as to form a loop over the tips of the toes. To give this extension the necessary hold, the circular turns must be firmly applied because in this way a hold is obtained at the heads of the first and fifth metatarsal bones. The same pull may also be effected if, after padding the heel with folded strips of gauze, the adhesive strip is brought round the heel along both edges of the foot and sewn up over the tips of the toes; the latter arrangement is useful in luxation of the foot to the back, because in such a case a heavier weight is needed on the extension. For transverse extension we need a pull perpendicularly to the long axis of the bone. The transverse pulls are applied to the peripheral and central fragments and by drawing them in a frontal and in a sagittal direction to the long axis of the bone, remove the dislocation.

The method of application of a transverse extension is to carry an adhesive plaster strip round the circumference of the limb and to sew it in the middle of the side, so as to form a loop by means of which the pull will act. A hole is cut in the loop and the cord for hanging the weight is fastened to a piece of wood set in the loop.

Leverage of the fragments in more marked dislocation to the side is strengthened by the application of further transverse pulls through which the fractured ends are drawn to the opposite side from that to which they were dislocated and the neighbouring joints are drawn to the same side. The fragments are thus levered back to the long axis of the bone.

A further improvement introduced by Bardenheuer is the adoption of rotation pulls to make good any rotation of the broken parts of bone and also the methods introduced by him for the raising of depressions and the avoidance of differences of level.

The rotation pull is made by a single circular turn of an adhesive plaster strip to whose free end a loop is sewn.

* It has not been possible to reproduce here the Röntgenograms and other figures referred to in this Appendix.

For making good differences in level Bardenheuer uses the so-called "cradle," (Figs. 1, 2, 3.) The action is evident from the illustrations. The simplest form is that shewn in figure 3. Two transversely laid, somewhat bent sheet iron bars are joined together by lengthways bars, over which run rollers. The plaster strip is laid over the fragment which needs to be depressed, brought through under the wheels and suitably weighted at both ends.

In all these pulls to the side we let the cords to the sides of the bed simply hang over the bed side, not run over rollers. For the lengthways pull we introduce a roller at the foot end of the bed (Fig. 4), though a hole bored in the foot board would answer the same purpose. For carrying the pull upwards we use the pole shown in Figure 5.

We do not use any other apparatus, so that the reproach that the extension needs a great deal of complicated apparatus is not justified.

By means of the pulls we have described we can keep the fragments in lasting contact after reposition, even in cases of the most severe displacement, and we can bring about healing of the fragments in the anatomical sense as the appended Röntgen pictures prove. Even if it must be allowed that a fracture which has healed with some slight displacement of the fragments does not necessarily cause any considerable disturbance of function, yet a perfect apposition of the fragments offers great advantages. First in importance is the fact that the time of recovery is shortened. Bardenheuer does not agree with the opinion of Voelker that the long duration of treatment, as we have it, in the joining of the fragments by a stitch through the bone, is to be considered to be due to the scanty formation of callus resulting from the exact adaptation of the fragments. According to him the excessive callus is much more the expression of defective contact between the surfaces of the bone, just as an excessive scar formation in the soft parts is the expression of a defective apposition of the edges of the wound as in secondary wound infection with yielding of the edges. Bardenheuer hence speaks of bone healing by first intention, and desires in the healing of a fractured bone, just as of skin wound, a primary union with as little scar, that is callus, as possible. The importance of a small formation of callus in or close to a joint as far as function is concerned, is clear. Further, it is obvious that through accurate adaptation of the fragments in a joint fracture the irritation caused by fragments of bone on the synovial membrane, the periosteum, the joint capsule and the surrounding muscles, is avoided.

Finally the extension pulls, besides leading to the correct retention of fragments, allow of passive and active movements of the joints concerned, even during the special fracture treatment.

In this way stiffening of the joint is avoided, and also the other injuries which long resting of an injured joint, filled with an effusion of blood, brings in its train. Through early passive, but, above all, active movements, we maintain the elasticity of the muscles of the synovial membrane, and of the capsule; nutrition is aided, the development of œdema is avoided as a result of the furtherance of the blood and lymph stream, adhesions of the tendons with the tendon sheaths and with the surrounding tissue, inflammatory adhesions of the joint surfaces, the surrounding capsule and the muscles with one another, and inflammatory shortening, and atrophy of the muscles are all avoided. Bardenheuer's extension treatment gives a joint which, after the end of the fracture treatment, is so freely movable that a medico-mechanical after-treatment is for the most part unnecessary.

In applying the bandage after reposition of the fragments, a helper grasps with one hand under the heel, with the other round the dorsum of the foot, and powerfully extends the lower fragment. After removal of displacements, the foot should be in a position at right angles to the axis of the leg, midway between pronation and supination, and should be so rotated round the axis of the leg that the inner edge of the great toe lies in a line with the inner edge of the patella, placed horizontally. As a rule, in malleolar fractures we put on an extension bandage, with the foot in a position of adduction. (Fig. 6.)

The pull *d* is first applied to draw the foot forwards (towards the ceiling) then the length extension *a* and the transverse pulls *b* and *c*. Through the pull *a* the foot is brought into adduction, through the transverse pull *b*, the lower end of the leg is drawn outwards, through *c*, the upper end is drawn inwards so that the lower end of the leg is levered outwards. The loading of the pulls is shewn in the illustrations.

The accompanying Röntgen pictures should prove the effectiveness of the bandage (Röntgenogram 1, *a* and *b* were taken before, *c* and *d* after the treatment of the fracture).

Warnings have often been given before as to keeping the foot during recovery permanently in the varus position. We allow this plea to hold good for many cases of adduction and inversion fractures, since in such cases placing the foot in the position of supination would throw the fragments at the outer malleolus still further from one another. In these fractures a groove remains palpable at the outer malleolus even after recovery; œdema and a condition of irritation in the ankle joint remains present for some considerable time. Our custom, therefore, is to apply the bandage for adduction fractures in the way shewn in figure 7; the length extension pull *a* is brought towards the outer side of the bed for the adduction of the foot; the transverse pull *b* inwards for the lower end of the leg, the transverse pull *c* outwards for the upper end of the leg. The foot remains in this position for *6* to *7* days; then we bring it into a position of slight supination (Röntgenogram II.)

In fracture of the anterior border of the tibia, a not very rare accident, we bring the foot into as great dorsal flexion as possible by the pull to the front (towards the ceiling). We have always obtained a good functional result and never seen any limitation of dorsal flexion.

One point needs attention in the treatment of ankle fracture, namely, that of making good the diastasis between the tibia and fibula, which arises in many malleolar fractures. Often there is only a tearing of the lig. tibio-fibularia. In most cases, however, the ligaments are more resistant and more or less large fragments are torn out of the outer surface of the tibia. These fractures usually go along with a fracture of the fibula a little above the external malleolus. If such a diastasis is not removed the astragalus does not find the necessary hold in the fork of the ankle; flat foot develops and uncertainty of gait, etc. (Röntgenogram VII.) Clinically in this fracture we find a narrowly localized pain on pressure at the outer surface of the tibia. In such cases the plaster of Paris bandage cannot exercise the necessary pressure on the malleoli without inducing pressure gangrene. But the extension bandage brings about the removal of the diastasis through the length extension, if the limbs of the ansa are brought close together by means of a buckle just in front of the sole, and so a continuous pressure is brought to bear upon the malleoli (Röntgenogram III).

Lateral displacements of the foot, of small grade, are fully made good by means of the adduction and abduction extension bandages. On the other hand, in more severe displacements, in true luxation, the so-called dislocation fractures, the adduction and abduction position of the foot in the bandage is further strengthened by transverse pulls.

In luxation of the foot in the talo-crural joint outwards, the foot, which is laid in an adduction extension, is brought into more marked adduction by the transverse pull *d*, which is laid over the ankle. (Fig. 8, Röntgenogram VI.) Reduction is easily accomplished with the knee flexed by carrying out adduction and rotation of the foot to the inner side. Figure 9 explains the treatment of luxation of the foot in the talo-crural joint inwards.

Abduction extension. Strengthening of the abduction through the transverse pull *d*.

Reduction must be carried out through abduction and rotation of the foot outwards, the knee being bent. Figure 10 illustrates luxation to the front. Through the pull *d* the foot is flexed dorsally, through the longtitudinal pull *c* it is drawn downwards (plantarwards) through the pull *d* to the back. Through the pull *a* the lower end of the tibia is pulled to the front, through *e* the upper end is pulled to the back, so that the lower end of the tibia is still more powerfully acted upon. (Pull *d* and *e* are transverse pulls which are sewn up at both sides of the bone and end in loops. Through weighting on both sides a powerful pull is exerted towards the back (substitute for the cradle pull). Reposition in incomplete luxation is arrived at by simple extension of the foot towards the back; in complete luxation it is a good thing to press the foot, strongly flexed dorsalwards, to the back and down and the lower end of the tibia to the front and produce a plantar flexion. (Röntgenogram IV.)

Luxation to the back is treated as in Figure 11. Through pull *c* the foot is pulled downwards plantarwards, through *b* in its long axis toewards, throught the cradle pull *d* the lower end of the tibia is pulled to the back; through *a* the upper end is pulled to the front, so that the lower end is levered towards the back.

In incomplete luxation the pull at the foot to the front, while the leg is pressed towards the back, is sufficient to bring about reposition. In complete luxation the foot must first be plantar flexed, then pressure be applied on the tibia towards the back and a pull on the plantar flexed foot towards the front and finally the foot be dorsally flexed (Röntgenogram V.)

If there be an accompanying displacement of the foot to the outer or inner side, this can be made good by carrying the length extension to the inner or outer side and by heavier weighting of the pull on the outer or inner side.

We use the extension bandage in complicated fractures if the wounds of the soft parts are small and we almost always use it in compound fractures. The neighbourhood of the wound is cleaned and covered with a smoothly laid strip of vioform gauze and with a mull compress. Over this the adhesive plaster strip is laid. When there is little secretion the vioform gauze remains until the wound heals and the extension bandage is taken off; otherwise it is changed as it may be necessary without the length extension needing to be taken off.

From the fifth day after the application of the bandage, onwards, the weights are dispensed with for an hour at the morning and evening visits and movements at the foot joint undertaken, first passive then active. Flexion, extension, and rotation are, however, only carried out so far as no pain is felt on the movements. After 3-4 days there is, as a rule, decidedly active mobility.

All fractures are Röntgen-rayed before the application of the bandage; in severe displacements we apply the rays again immediately after the application of the bandage, otherwise first after eight days in order to be able to make good through different weighting of the pulls any small displacements which, though not perceptible clinically, may be shown by the rays.

The extension treatment lasts on an average—

For fractures of the malleolus externus	...	12 days,
,, ,, ,, internus	...	14 ,,
,, .. ,, .. both malleoli	...	14 ,,
With accompanying marked luxation	...	16-18 days.

Our principle is to let all cases with ankle fractures even if no displacement is present, lie in bed for 5 weeks. The body weight should only be borne on an absolutely firm bone. In extension treatment especially, the patients do not need to stand up as they do when fixative bandages are used, since the muscles in extension are not condemned to complete inactivity. Ambulant bandages we do not apply. The results of the extension treatment in malleolar fractures, as they are supplied in the following statistics, we have determined by questions addressed to sick clubs and trades unions. We have received information in the kindest manner from 35 sick clubs (one refused information) and from the following trade unions, to whom we now express our thanks:—

1. Rheinisch-Westfälische Baugewerks—B.-G.
2. Hessen-Nassauische Baugewerks—B.-G.
3. Fuhrwerks B.-G.
4. Norddeutsche Holz—B.-G.
5. Lagerei B.-G.
6. Maschinenbau and Kleineisen-Industrie—B.-G.
7. Strassen—and Kleinbahn—B.-G.; and
8. der Königlichen Eisenbahn Direction, Cöln.

The questions we put were:—

1. If complete fitness for work was regained.
2. In case of complete fitness for work not having been yet regained:—
   (a) Is the incapacity permanent?
   (b) What is the percentage amount of incapacity?
   (c) What is the cause of the incapacity?

In putting our questions we have followed the example of Loew and Bliesener in order to be able to compare our results. We have differed from them only in so far that we have counted amongst those in receipt of sick pay not only those in receipt of permanent sick pay, as Loew and Bliesener have done, but also those who at the time of preparation of the statistics were drawing sick pay. In what other way should we count persons who at that particular time were drawing sick pay, and about whom it was not yet established whether they would do so permanently? Our statistics embrace the time from 1897 to 1st April, 1903. We have collected our information in April, 1904. All those who at this time were receiving pay are included. It is clear that in consequence our results must compare unfavourably with those of Loew and Bliesener.

Besides ascertaining those in receipt of sick pay, we also were concerned in determining who, among the injured persons, were fully fit for work before the thirteenth week, who after this time. We have not estimated the exact duration of recovery, since this is so largely determined by external circumstances, particularly if it is a question of fitness for work before the beginning of the 14th week, since with regard to this time the kindness of the doctor and the goodwill of the patient will play a great part. But even after the end of the 13th week the reckoning is not uniform, since the procedure in different trade unions with repect to full and partial pay is different.

In order to satisfy ourselves, personally, as to the results, we have sent for the people concerned, and the greater part have appeared for an after-examination; unfortunately, only 2 of the 7 in receipt of pay were amongst these.

We have for our statistics, reports on 149 cases of injury (1897–1903):

Fracture of a malleolus	86
Recovered before the completion of 91 days	75=87·2 %
Recovered after 91 days	11=12·8 %
In receipt of sick pay	0=0 %
Fracture of more than a malleolus ...	68
Recovered before the completion of 91 days	42=66·7 %
After 91 days	14=22·2 %
In receipt of sick pay	7=11·1 %

Thus for ankle fractures generally the following are the figures:—

Ankle fractures	149
Recovered before the completion of 91 days	115=77·2 %
After 91 days	27=18·1 %
In receipt of sick pay	7=4·7 %

Statistics of Loew (1891–1896):—

Fracture of a malleolus	68
Recovered before the completion of 91 days	58=85·3 %
After 91 days	10=14·7 %
In receipt of sick pay	0=0 %
Fracture of more than a malleolus ...	38
Recovered before the completion of 91 days	21=55·4 %
After 91 days	16=42 %
In receipt of sick pay	1=2·6 %
Ankle fractures in general	106
Recovered before the completion of 91 days	79=74·6 %
After 91 days	26=24·5 %
In receipt of sick pay	1=0·9 %

Statistics of Bliesener (1896–1897)—

Fracture of a malleolus	9
Recovered before the completion of 91 days	8=89 %
After 91 days	0=0 %
In receipt of sick pay	1=11 %
Fracture of more than a malleolus ...	21
Recovered before the completion of 91 days	18=85·7 %
After 91 days	3=14·3 %
In receipt of sick pay	0=0 %
Ankle fractures in general	30
Recovered before the completion of 91 days	26=87 %
After 91 days	3=10 %
In receipt of sick pay	1=3 %

Putting together our results and those of Loew and Bliesener, we obtain the following:—

Ankle fractures	285
Recovered before the completion of 91 days	220=77·2 %
After 91 days	56=19·6 %
In receipt of sick pay	9=3·2 %

For further comparison the statistics of Haenel and Jottkowitz may be taken.

Haenel, who first provided statistics of accidents reports in *Deutsche Zeitschrift für Chirurgie*, Bd. 38 ("On Fractures with respect to the Accident Insurance Law") on 40 malleolar fractures: of these 28=70 % were recovered, 12=30 % were disabled.

In any comparison with this result it is, however, to be considered that these cases were not treated on any uniform method, and to a large extent not in hospital. More informative is a comparison of our statistics with those of Jottkowitz (*Deutsche Zeitschrift für Chirurgie*, Bd. 42, "On Results of Fractures of the Leg in connection with the Accident Insurance Law"). Jottkowitz reports on 50 ankle fractures from the Knappschaftslazerett at Königshütte, the cases being all treated on a uniform method in the same hospital:—

Fracture of a malleolus	36
Recovered before the completion of 91 days	29=80·6 %
After 91 days	1=2·8 %
Disabled	6=16·6 %
Fracture of more than a malleolus ...	4
Recovered before the completion of 91 days	0=0 %
After 9 days	1=25 %
Disabled	3=75 %
Ankle fractures in general	40
Recovered before the completion of 91 days	29=72·5 %
After 91 days	2=5 %
Disabled	9=22·5 %

Jottkowitz does not mention whether the cases described by him as disabled were drawing permanent sick pay; the word seems, however, generally not to indicate permanent sick pay.

It may be mentioned that of the 149 cases with which our statistics deal, 20 had passed the 50th year of life (one was 61 years old). In half of these cases the injury was fracture of both bones. 19 have become fully fit for work, 1 is drawing permanent sick pay of 33⅓ %. The restoration of the function of the injured joint in these older people must specially be taken as proof of the good effect of the extension bandage.

The following short extracts from the notes of the 7 persons in receipt of sick pay may be appended:—

1. N. 32 J.—Jumped a metre's length, the right foot twisted.

Fracture of the malleolus externus and of the whole external tibial surface with displacement of this fragment forwards. After 35 days left the hospital with good position of the foot. 33⅓ % on account of arthritis in the ankle.

2. L. 59 J.—Falling of an iron ladder from the outer side on to the right foot. Fracture of both malleoli and of the external tibial surface with luxation of the foot outwards and backwards. Discharged after 47 days with good position of the foot but slight impairment of flexion. Slight abduction position; on the sound side position of flat foot. Should wear a support. 33⅓ % on account of inflammatory traumatic flat foot.

3. F. 28. J.—Fell with his left foot in a grating. Fracture of the internal malleolus and fibulæ supra-malleolaris.

Discharged after 31 days with a good position of the foot, slight impairment of dorsal flexion. 15 % because of weakness in the foot.

4. M. 40 J.—Run over by an automobile. Fracture of the external malleolus and of the external surface of the tibia. Discharged after 45 days with slight limitation of movement. 20 % because of weakness of the foot, until further notice.

5. F. 25 J.—Twist of the right foot. Fracture of the internal malleolus and supra-malleolar fracture of the tibia. Discharged after 48 days with good position of the foot without impairment of movements. 15 % because of slight symptoms of flat foot until further notice.

6. W. 38 J. Twist of the foot. Fracture of the malleolus externus and of the external surface of the tibia. Left the hospital against medical advice after four weeks, with good position of the foot and good function.

10 % until further notice because of weakness of the ankle.

7. D. 31 J. Twist of the foot. Fracture of both malleoli and of the external surface of the tibia. Flat foot both sides. After 36 days discharged with good function.

10 % until further notice because of symptoms of flat foot.

In cases 1 and 2, permanent sick pay is probable even though not yet awarded. In the 5 other cases the bestowal of sick pay is only temporary. If, like Loew and Bliesener we only bring into our reckoning as receivers of sick pay those with permanent sick pay, we have for the years 1897-1903 only 2 = 1·3 %, for the years 1891-1903 4 = 1·4 %.

The greater number of fractures of both malleoli, as compared with the reports of Loew and Jottkowitz, is explained by the fact that we, as Bliesener had already done, believed it necessary to count among the combined ankle fractures that common form of fracture, the fracture of Dreieck at the outer surface of the tibia (Volkmann's fracture).

No one will doubt that our results collected from impartial accounts are truly good. Yet there remains behind, according to Borchardt (Handbook of Practical Surgery, 2nd edition), in about 25 to 30 % of the cases of malleolar fracture treated on other lines a limitation of the capacity of use of the foot of differing degree (up to about 50 % capacity for work).

Why is it that the extension treatment, in spite of its good results, does not find the general use which it deserves?

The objection is raised that it is difficult to learn, and because of the difficulty of the technique and the necessity for constant supervision is only suitable for use in hospitals. Bardenheuer has expressed his view with regard to these objections at the conclusion of his work, mentioned above, in the *Archives Internationales*. According to him treatment in hospital is indicated for fractures with great dislocation of the fragments, and for fractures into or in the neighbourhood of the joint; such treatment is almost always given in the larger towns, if for no other reason because in these the Röntgen apparatus is always now provided, and a control as to the position of the fragments in joint fractures is indispensable. Gymnastic exercises during the special fracture treatment should only be carried out by the doctor himself or by trained persons under the supervision of the doctor. Bardenheuer admits that the extension treatment demands much care, diligence and a steady supervision. But the greater care and trouble is rewarded by the far shorter period of consolidation, still more by the shortening of and in many cases the dispensing with after treatment, but above all by the far better functional result. That these advantages far outweigh the

apparent disadvantages of hospital treatment, the greater outlay, the separation of the patient from his family, etc., does not need to be insisted on.

If, from the records of trades unions and disablement insurance, it were shown how many of those in receipt of sick pay were unfitted for work or had a diminished power of work as a result of a fracture, the great number of these cases would cause astonishment. It is evident that a large sum would be saved to the State and a great amount of strength for work saved, by diminution of the number. Considered from this social standpoint an effort must be made in the large number of fractures to obtain as good functional results as possible and this can be done in most cases only in hospital. It is therefore to the interest of the trade unions, but also of the community and the State, which have often to step in to the aid of injured persons unfit for work, if not insured against accident, to aim at the treatment of recent fractures in hospitals, and of trade union cases preferably in special hospitals. Bardenheuer believes the last demand to be so far a just one, that he has divided from the other parts of the hospital a special department for fractures and consigns it to the care of an older assistant, who for the most part is only concerned with the treatment of fractures.

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(2) ON THE TECHNIQUE OF THE EXTENSION TREATMENT.

Oberarzt Dr. Schrecker, of Cologne.
Kommandiert zum Bürger-hospital.

(*From the Deutsche medizinische Wochenschrift, No. 39, 1908.*)

Bardenheuer's extension treatment of fractures is of such great interest that it seems to me well to call attention to certain changes which we have recently made in the technique of the method.

When the extension treatment is carried out on Bardenheuer's system, the transverse pull or, in the case of a pull to the back, the so-called "cradle pull" is indispensable. Formerly, for the application of these pulls, instead of the rather costly apparatus described in Bardenheuer's and Graessner's text book, we employed a "cradle," which was composed of two long bars, provided with wheels, the bars being joined to one another by transverse somewhat curved sheet iron bands. The strip of adhesive plaster, folded double, and made as usual out of canvas, was laid over the site of the fracture which needed to be pressed back, then carried through under the wheels and suitably weighted at both ends.

These cradles had the disadvantage of not being sufficiently steady; they were easily displaced and the pull, in consequence, was frequently transposed to sites lower than had been intended. Moreover, as the result of the tendency of the pull to move towards the back, the chief point of action came to lie more on the lower segment of the cradle. The result was that the upper part tended to be raised to the front, and the effect of the pull was naturally weakened.

I have tried to avoid this disadvantage by laying the cradle on an evenly firm surface, and by adding an adjustable sliding apparatus. This arrangement had the additional advantage of dispensing with a considerable part of the friction, unavoidable when the limb lay directly upon the mattress. Such friction was cited by Sprengel, amongst others, as a material disadvantage of Bardenheuer's method.

The board with its adjustable slide* apparatus consists of a polished beechwood surface, on whose sides, as is seen in the illustration, grooves are made: in these the slides are fixed at will with screws at the place corresponding to the desired pull. The slides are so arranged that they can be pushed towards the middle of the board and the distance between them can be adequately adapted each time to the circumference of the limb; for the rest their structure is similar to that hitherto in use, that is to say, they consist of rods over which the rollers run.

Formerly, in making the extension bandage, we used exclusively zinc oxide adhesive plaster on grey canvas; this was made firmer by overlapping turns of perforated mild india rubber plaster; both kinds of plaster were prepared at the Helfenberg Chemical Works. Now we chiefly make use only of Heusner's resinous adhesive plaster, and limit the use of the other plaster to smaller bandages on the upper limb and to children. Heusner uses for his adhesive fluid a solution of Venetian turpentine in spirit in the proportion of 1 : 2. According to his prescription, only the best turpentine is used—a clear fluid, like honey, of a yellow-green colour and pleasant resinous odour; the cheaper kind allowed by the pharmacopoeia possesses less adhesive power.

The solution is sprayed on to the limb by means of a spray apparatus (like an iodoform ether spray); then a strip, 8-10 cm. in breadth, of rough woollen or cotton material (thick cloth, fustian, beaver) is applied in the ordinary way to both sides of the bone—the malleoli and anterior border of the tibia are to be protected from pressure by smothly folded strips of gauze—and fastened on by a few turns of bandage, with an accompanying light massage. In the stirrup at the sole of the foot is placed either a small piece of wood or—what, according to Heusner, is better—a roll in the form of a cotton reel, which indents less and can be easily moved.

Heusner finally surrounds his bandage with a starched gauze bandage, in order to give it greater stability. The latter is not, however, absolutely necessary, and the object can be attained by spraying some of the adhesive fluid on to the upper part of the thigh before the end of the bandaging, and applying the turns of bandage in this situation very carefully and somewha firmly.

According to Heusner, the extension bandage is at once able to bear a weight of 20 kg. and more; it gives rise to no symptoms of irritation, and fulfils all the conditions of a thoroughly adhesive bandage.

It has various, not unimportant, advantages as compared with the customary adhesive plaster bandage:

(1) It is extraordinarily cheap. An extension bandage for a fracture of the thigh costs, with adhesive plaster, about 5 marks, while 300 gr. of Heusner's adhesive fluid, with which five bandages can be constructed, can be obtained from any chemist for 2 marks.

(2) It can be quickly applied. Heusner's bandage is in position in a short time—within a few minutes—a thing not possible, even in trained hands, in using adhesive plaster.

(3) It can be easily taken off without giving rise to any unpleasant symptoms whatever.

Just this last peculiarity is of special value. Anyone who has had the doubtful pleasure of taking off an adhesive plaster bandage in a sensitive person, even with the help of free use of æther or benzine, will be astonished at the ease and comfort with which the strips can be taken off after cutting through the encircling bandage.

We have used the resinous adhesive bandage in our large fracture department for more than a year, since Herr Geheimrat Heusner had the goodness to demonstrate it to us in person, for all fractures of the lower limb, and we are very much gratified by the result.

We are persuaded that it forms a great advance on the technique of the extension bandage, and we can, therefore, recommend it most pressingly to our colleagues, whether in private or hospital practice.

In using Heusner's resinous adhesive bandage, the possibility also presents itself of strengthening the action of the pull by means of a small modification. This is desirable in fractures of the lower half of the leg accompanied by considerable shortening. The usual extension bandage, whether it is applied in Heusner's way or in the way usual with us formerly, does not in this situation suffice to fully make good the shortening. The surface for attack at the lower fragment is too short to afford an adequate pull, and the instruction to apply the circular plaster strips as far as beyond the ankle does not much alter matters.

My method is to carry a narrow strip of felt above the malleoli round the leg and to sew it at the side with exactitude to the long strips of the Heusner's bandage; anteriorly on the extension side the ends are united by a few stitches.

By this arrangement the lengthways pull surrounds the ankle like a cuff, and, naturally, exercises in this way a considerable force of pull.

I have succeeded by this method in completely removing the shortening in a series of spiral fractures and supra-malleolar fractures of the leg; I would, therefore, recommend it for adoption in suitable cases, though I would mention that extraordinary care must be taken with regard to decubitus.

* To be obtained from the instrument makers, Vogel-Grevenberg, Köln, Herzogstrasse; price 8 marks.

Remarks

ON

FURTHER EXPERIMENTS CONCERNING THE ORIGIN OF LIFE.*

BY

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My work entitled *The Origin of Life* was based in the main on 196 experiments with hermetically sealed tubes whose contents had been exposed to high temperatures.

Since the date of its publication in the spring of 1911 I have performed a much larger series of experiments, as many as 280, and consequently should be in a position entitling me (1) to pass some judgement on the value of my previous results; (2) to deal more or less authoritatively with the doubts expressed by others as to the validity of my conclusions; and (3) to offer some useful advice to those who may wish successfully to repeat my experiments.

1. The Nature of the Problem and the Extent to which it has been Solved.

It has long been widely believed in the world of science that the occurrence of "spontaneous generation" is a myth.

This view gathered strength thirty to forty years ago, seeing that the experiments of Pasteur, and later those of Tyndall, induced them to urge it with much insistence; and because, moreover, it has seemed to be in accord with the practice found needful in bacteriological inquiries of growing importance.

In all their experiments Pasteur and Tyndall, as well as previous experimenters, made use of solutions of organic matter—mostly infusions of different kinds—heated to 100°–105° C. for varying periods, and subsequently protected more or less securely from external contamination. All these solutions or infusions must have been more or less teeming with bacteria of different kinds, as well as with torulae and germs of common moulds. This would have been notably the case with hay infusions, which were so largely used by Tyndall.

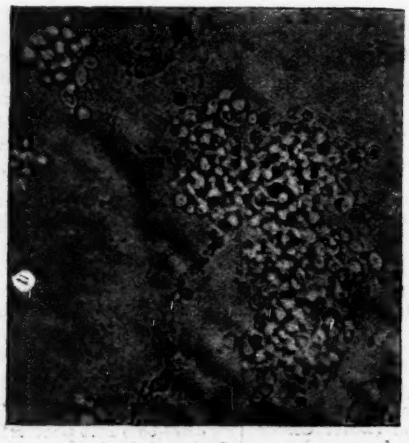


Fig. 1.—One of several groups of small torulae beneath the same cover-class, as taken direct from a tube exposed to light containing a yellow solution, which had been heated seven months previously to 100° C. for twenty minutes on three successive days. × 700.

These experimenters made no attempt whatever to exclude such organisms and their germs. They trusted to what was known and well established concerning the lethal influence of heat on living matter immersed in fluids, and consequently to their ability to sterilize the solutions and vessels used.

Having extinguished all life in their media and receptacles, they exposed them for varying periods to what were considered suitable incubating temperatures. Then, if evidences of fermentation showed themselves within the experimental fluids, they were seemingly content to account for it as a result of some error; while their numerous negative results impressed them so strongly that they were induced to favour a general conclusion far wider than was warranted by their premisses.

My own experiments have been of the same order, only much more stringent, seeing that instead of infusions of organic matter I have of late been dealing with saline solutions only, always contained in hermetically sealed vessels, and, moreover, often heated to temperatures very much higher than those employed by my predecessors. My saline solutions have also contained some bacteria, toruloid corpuscles, and germs of mould, though probably very much fewer than those existing in the organic infusions dealt with by Pasteur and Tyndall, whose experiments have been believed to be so decisive.

Thus, if from the basis of their negative results they felt themselves warranted in proclaiming their belief that the present occurrence of "spontaneous generation" was a myth or chimera—a view which has been so widely accepted—how much stronger is my warrant for the opposite belief, looking to the very numerous occasions on which, when opening previously sterilized tubes and solutions, I have taken therefrom undoubted living organisms.

Even one such positive result free from all error is, of course, worth more than any number of negative instances. It will be well to consider, therefore, the various possibilities of error that have been suggested.

2. Reply to Criticisms.

Some of my critics—mostly not biologists, and presumably not thoroughly acquainted with bacteria and torulae—have supposed that what I have taken from my tubes have been mere pseudo-organisms such as Leduc, Herrera, Jules Félix, the brothers Mary, and other plasmogenists are able to produce from various saline solutions—bodies which undoubtedly often simulate organic forms with great exactness. This, however, is an absolute error not likely to be shared by biologists, and one which is shown to be erroneous by the fact of the free multiplication of my organisms when taken from their own media and introduced into other quite different nourishing fluids.†

Others do not doubt that the organisms found and photographed are real organisms, but cannot believe that they have really been engendered within the tubes.

Some of these suggest that the organisms found have rushed into the tube from the atmosphere when its neck has been filed off. But there is practically no inrush of air at this time; certainly none that would suffice to carry atmospheric germs at once through the fluid (about 1½ in. deep) to the sediment at the bottom of the tube, where the organisms are always found.

Others suggest that the organisms may have been contained in the pipette; but this is always thoroughly heated in a spirit lamp flame just before it is introduced into the freshly-opened tube. And when a small quantity of the sediment is obtained by the pipette, it is at once transferred to a thoroughly clean microscope slip and covered with a cover-glass.

Then torulae are supposed by some of my critics to fall from the atmosphere on to the drop of fluid on the microscope slip, during the moment or two that it remains uncovered. This supposed explanation, however, of the presence of organisms found by me is mere unsupported theory, as any one would soon find who set himself to discover torulae in the way suggested, and by an examination of Fig. 1. That such formed organisms, and often in such numbers, could have been gathered from the atmosphere during the transit of the pipette for one or two feet from the mouth of the tube to the microscope slip, and before the drop of the solution is covered is, in fact, devoid of all probability, and will be shown to be so by the numerous cases subsequently to be referred to in which, during similar examinations of various series of other tubes (barren), no organisms whatever could be found.

Other critics are content to assume that the organisms found are not living. They believe them to be dead organisms, some of those pre-existing in the experimental fluids, but killed by the heat to which they and the tubes have been subjected.

This objection requires to be looked at in more detail, because it is admitted that some few organisms may be found in the experimental fluids, derived from two of the constituents of such solutions—namely, the sodium silicate and the ammonium phosphate—the dilute phosphoric

* Paper read before the Pathology Section of the Royal Society of Medicine on November 19th, 1912.

† Solutions of 3 per cent. glucose and of 5 per cent. cane sugar, as well as the ammonic tartrate solution referred to in *The Origin of Life*, p. 35.

acid, the liquor ferri pernitratis, and the freshly distilled water being, however, free from them.

Any such pre-existing organisms would, of course, have been killed by the sterilizing process; but seeing that in each tube there would only be one to three drops of the dilute sodium silicate, either alone (in the yellow solutions) or in association with three or four grains of ammonium phosphate, as in the colourless solutions, these pre-existing organisms could never be very numerous within the tubes. It is very important to note, moreover, that

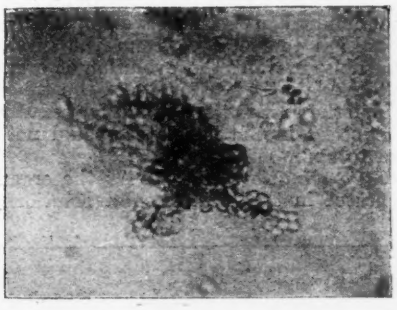


Fig. 2.—Large group of the "elementary organisms" taken from a tube containing a colourless solution which had been exposed to light for nine months after having been heated to 135° C. for five minutes in a colza oil bath. × 700. Another sample of the sediment from this tube was ringed with paraffin, and after four days swarms of torulae were found beneath the cover-glass.

nothing like well-developed torulae are ever to be seen in either of these newly prepared solutions. There are, however, often a few very minute spherical organisms (such as are shown in Fig. 14 of *The Origin of Life*), and, more rarely, a minute mould may be found when a control tube is opened, and some of the sediment is examined the day after the sterilizing process.

But let months elapse, with suitable exposure, before other tubes of the same series are opened, and then these minute "elementary organisms," as Professor Hewlett terms them, may be found in large numbers within the tubes, and staining freely with eosin or carbo-fuchsin. These primitive organisms are very slow and sluggish in their growth, requiring some months for origination and for their development from ultra-microscopic particles to the minute embryo bodies that are often so numerous, but which may not always be easily shown to be living in the way that is open for torulae and bacteria. Still when tubes containing them have been closed, and then left undisturbed for twelve months or so, they have often been found to have given rise to minute moulds, mostly of the Streptothrix type

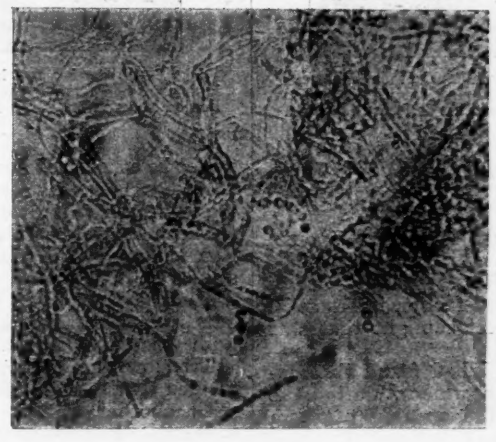


Fig. 4.—Mould from a colourless solution which had been heated in an autoclave to 130° C. for ten minutes five months previously to its being first opened, when numbers of the "elementary organisms" were found, but no moulds. The tube was then securely closed, and opened again after the lapse of twelve months, when numbers of small moulds of Streptothrix type were found on the flakes of silica, as well as a much larger mass, part of which is shown here. × 500.

The fact, however, that such minute organisms are either very scarce or not to be found at all in control tubes, and to be abundant, as in Fig. 2, after months in other tubes of the same series which have never previously been opened, is conclusive evidence that they have developed and multiplied within the tubes.

At other times, moreover, these "elementary organisms" are found to be associated with well-developed torulae or with bacteria, which can be shown, in the course of a few days, to be living by the growth and multiplication which they undergo under the conditions indicated at p. 39 of *The Origin of Life*—that is, either (*a*) by their multiplication on the microscope slip, beneath a cover-glass which has been ringed with paraffin; or (*b*) after their inoculation into certain nourishing fluids that have been previously sterilized.

The so-called "elementary organisms" are, as I believe, to be regarded either as potential embryo torulae, or as fungus-germs.* At times when they have been inoculated into a sterilized ammonic tartrate nourishing solution, swarms of full-grown budding torulae have been found after a few days; while when left in their own tubes at ordinary room temperature for many months, minute moulds have, as I have said, been found within the tubes, one of which is shown in Fig. 4.

Finally, other critics, unable from the evidence adduced

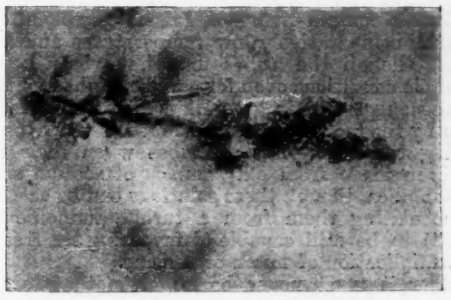


Fig. 3.—Bacilli and a minute mycelium, stained with eosin, from a colourless solution which had been heated to 100° C. for twenty minutes on three successive days, and was opened after having been six months in an incubator, first at 27° and then at 37° C. × 700.

to doubt that what I have taken from my tubes have been veritable organisms rather than mere pseudo-organisms, that they have really been taken from the tubes, and that they have been really living organisms, fall back upon the only remaining means of staving off the conclusion that they have been engendered *de novo* within the tubes. They hint darkly that some *desiccated germs* (hitherto unknown) may have been able to survive in the heating processes to which I have had recourse, though these have included exposures from five to twenty minutes to temperatures ranging from 120° to 145° C., or else the method vaunted by Tyndall as lethal for all desiccated germs, and now universally trusted by bacteriologists as a safe means of sterilization.

Strange that this objection should be raised now, seeing that my earliest results in 1870 were disbelieved in by Huxley, Burdon-Sanderson, and others, because of the strength of their belief that bacteria and torulae could not survive a heat of even 100° C. for a few minutes in fluids, and seeing that Pasteur himself never thought it needful to use a higher temperature than 110° C. in any of his experiments. This objection is, however, a sort of refuge of the destitute, which has always played a large part in discussions concerning the *de novo* origin of life.†

But where are the obdurate desiccated germs imagined to come from, and why have they hitherto eluded discovery?

They cannot exist in the yellow solutions, which contain only about two or three drops of the dilute sodium silicate solution and four drops of the liquor ferri pernitratis to the half ounce of distilled water, yet it is precisely these particular solutions which

* Associated with them there can often be seen a number of particles of different sizes down to the *minimum visible* stage, doubtless representing different stages in their growth and development. Precisely similar associations with growing torulae were seen and described by me in *The Beginnings of Life* (1872), vol. i, pp. 281–283.

† After what has been stated on p. 58 (*loc. cit.*) concerning the sterilization of the tubes employed, no one has ventured to renew a previous objection and say that the experimental vessels have not been sufficiently *flambés*. All germs on the tubes, when nearly red hot, would have been effectually burned off.

I have found to yield a distinctly greater variety of organisms than the colourless solutions, into which desiccated germs might be introduced by the 3 or 4 grains of ammonic phosphate contained in each tube. Different kinds of mould have often been found in these yellow solutions, two of which are shown in Figs. 5 and 6.

Any such doubt is however easily solved by introducing 5 or 6 grains of this salt into one ounce of the sterilized ammonic tartrate nourishing solution, and boiling it merely for five instead of twenty minutes on three successive days.

Treated in this way ammonic phosphate crystals cannot be shown to contain living organisms capable of resisting even such comparatively low temperatures and short exposures, though the tubes may have been kept under favourable conditions even for seven or eight months. And that the suggestion is groundless in the present case is shown by the fact to which reference is made on p. 1545 touching the barrenness of tubes when their solutions have been made from old samples of sodium silicate or colloidal silica, though these solutions can be easily shown (by inoculating them from a turbid ammonic tartrate solution) to be still capable of favouring the free growth and multiplication of micro-organisms.

Further, it must never be forgotten that torulae and micrococci, which have so frequently been taken from the tubes (and more especially the former), are not known to

Fig. 5.—Mould of Streptothrix type, as taken from a tube containing a yellow solution which, after having been heated to 100° C. for twenty minutes on three successive days, was exposed to light for seven months. × 300.

be capable of resisting temperatures even of 60° to 70° C. for two or three minutes

3. Concerning the New Experiments and What Should be Done in Further Trials.

(*a*) *Exposure to Daylight or in the Incubator.*—One of the first points as to which I needed further information was the extent of exposure to direct sunlight that was advisable.

As related (loc. cit., pp. 50, 56), I had found that exposure of the tubes inside a south window during the last three to four weeks before the opening of them (and in not very hot weather) was followed by good results, though I was always rather doubtful whether this was not merely due to the increased heat to which they and the solutions were thus subjected.

In the spring and summer of 1911 a number of tubes were exposed from the first inside a south window, the weather being unusually bright and warm during most of the time. The result was that when the time came for their examination the solutions were found to be nearly all barren. As I subsequently ascertained that the temperature of the window ledge on which the tubes stood rose often daily for some hours to 43° C., or even rather higher, I am disposed to think that the harm was probably more due to the prolonged and repeated high temperatures than to the effect of the mere actinic rays through the window-glass and that of the tubes.

In view of this experience I now advise that all tubes exposed to light should be placed just inside a north, or, better still, a north-east window, unless they can be put into a conservatory, and protected there from the direct rays of the sun.

Tubes exposed to light should not be examined till nearly six months have elapsed in summer, or eight to twelve months when much of the time of exposure has been in colder and duller weather.

During winter months I have, however, of late made use of the incubator, maintained at 27° C. and at 37° C., and I prefer half of the time to be at the lower and half at the higher temperature. I cannot say positively at present whether it would or would not be desirable to use the higher temperature from the first; though I have found that a final temperature approaching 43° C. for two weeks has been distinctly harmful, often apparently killing plenty of torulae found when the tubes were opened.* Exposure to such a high temperature from the first, therefore, would probably prevent the evolution of organisms, and thus would explain the barrenness of the tubes that were exposed from the first to the hot sunlight of 1911

Tubes exposed in the incubator should not be opened under four to six months.

(*b*) *New Combinations Tried.*—As the organisms were often so scarce in the experimental solutions, and this

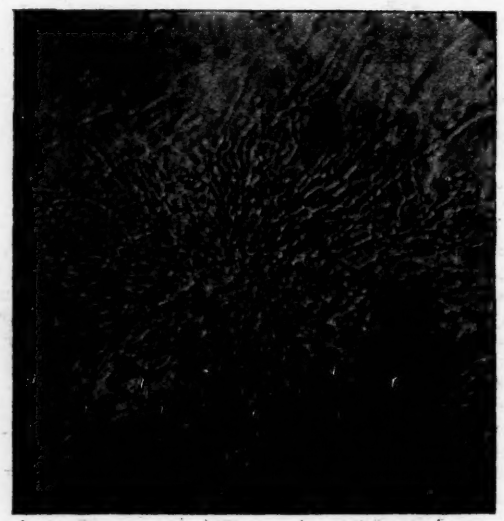


Fig. 6.—Part of a much larger mould of the same type as the last, as taken from a companion tube which had been similarly heated and similarly exposed to light for seven months. × 300.

might be considered due to the scarcity of carbon within the tubes, I made a series of tentative experiments trying to remove this disadvantage, as a result of which I found that the colourless solutions could be varied by the addition (to each fluid ounce containing the ordinary constituents) of 4 grains of neutral ammonic tartrate with 2 of sodic phosphate; and also by the addition to each ounce of 4 grains of ammonic carbonate, or 6 grains of pure glucose.

Trials with the first of these more complex solutions yielded torulae with one sample of sodium silicate, but not with another, though the organisms were not notably more abundant than they have previously been found to be in a similar solution without the additions indicated.

Those in which ammonic carbonate was added have all been barren; and those with the addition of glucose have also all been barren. In the latter case, however, the solutions were unfortunately made this spring with some of an old sample of sodium silicate.† Further trials with the addition of glucose ought therefore to be made.

None of these additions could be made to the yellow solutions without causing their complete decomposition.

Another variation in the solutions with which trials have been made has been the substitution of Kahlbaum's 10 per cent. sodium silicate for one of the ordinary

* On two or three occasions they have really been very numerous, but apparently dead, as no evidence of subsequent multiplication could be obtained. It looked as if growth and multiplication had been at first stimulated, and that the continuance of the high temperature had ultimately killed the torulae.

† Though the tubes were opened after they had been in the incubator for six months, no organisms of any kind could be found. I then inoculated each of the tubes with three drops of a turbid ammonic tartrate solution, and replaced them in the incubator. At the expiration of only *two days* each fluid had become slightly turbid, and was found to be swarming with bacteria

commercial preparations. This was used in the proportion of 14 drops to the ounce for the colourless solution, and 7 drops for the yellow solution; the quantities of the other ingredients being in each case those usually employed. But in all these trials the solutions have either been almost barren, or have only yielded bodies of an uncertain nature. Torulae have never been found in either of them, though in the yellow solution what appeared to be large sausage-shaped bacilli were taken from three tubes of the same series.

It seems clear, therefore, that in the ordinary commercial sodium silicate additional elements must be present that are not found in the 10 per cent. solution, and which, in some way, help to favour the evolution of living units.

(*c*) *Preparation of the Solutions.*—A very important point has only lately been thoroughly brought home to me, which is that too old solutions of sodium silicate must not be employed. I have carefully kept the solutions obtained in the spring of 1910, not only with the view of myself repeating combinations which I had previously found successful, but in order that I might give others desiring to repeat my experiments some of the actual materials used by me.

During the present year solutions prepared exactly as they had been in the previous summer and earlier have no longer been yielding torulae and bacteria as of old. I found first that the yellow solutions made exactly as they had been before became decomposed, and that the colourless solutions, which after the heating process should have yielded a slight amount of deposit, showed none at all. Thus many tubes were spoilt; and when by slight alterations in the number of drops of the dilute sodium silicate for the colourless solutions I succeeded again in producing a scanty deposit after heating, even then, after due exposures either to daylight or in the incubator, no torulae were found when the solutions came to be examined. The deposit itself, moreover, had not the same character as of old.

These irregularities caused much perplexity at first, but I have now come to the conclusion that they must be due to changes which have taken place in the stock supplies of sodium silicate that I have been using since the spring of 1910. That these have undergone some change is now, indeed, obvious, since at the bottom of each bottle there is a white cloudy deposit nearly an inch in depth, which has been gradually increasing. This was comparatively unheeded by me, as, when using either of the solutions, I had been accustomed to withdraw with the pipette only some of the clear supernatant fluid.

Several times during this year solutions that I have prepared exactly like those which formerly yielded a fair amount of torulae have proved, after similar exposures, to be so barren that not a single torula could be found.

I had not suspected this kind of degradation with the ordinary commercial sodium silicate, though I had, nine months ago, recognized that the dilute colloidal silica with which I was so uniformly successful in 1910 had in some way lost its virtues, seeing that the next time I used it, after an interval of eight months, solutions similarly prepared and similarly treated no longer yielded torulae as before. I looked upon this as a well-known unstable fluid, liable to undergo change, but had not suspected that the commercial sodium silicate might also, though after longer periods, undergo changes, and similarly become less productive when used as a constituent of one of the previously fertile solutions.

How soon the colloidal silica undergoes these harmful changes I am at present unable to say, but I am afraid it does so even in the course of a few months. In his original description Professor Graham[1] said: "Another and eminently characteristic quality of colloids is their mutability. Their existence is a continued metastasis. . . . The solution of hydrated silicic acid, for instance, is easily obtained in a state of purity, but it cannot be preserved. It may remain fluid for days or weeks in a sealed tube, but it is sure to gelatinize and become insoluble at last.* . . . To the gradual manner in which colloidal changes take place (for they always demand time as an element) may the characteristic protraction of chemico-organic changes also be referred."

*The solution I have been using is so dilute that it never actually gelatinizes.

Dr. Rosenheim was kind enough to prepare and give me a new supply of the very dilute colloidal silica last November, and a few tubes were at once prepared in which it was one of the constituents. Two of these were examined after they had been only five and seven weeks respectively in the incubator, and no torulae were found after these short periods, while two others were opened after thirteen weeks, one of which had been in the incubator and one exposed to light, and in each of these latter tubes a moderate number of typical torulae were found.

Other solutions were made with it barely four months after it had been received. Two of these tubes were examined after seven weeks and no torulae were found, while others were recently examined after four to seven months, and they also, much to my surprise, have been barren. I fear, therefore, that this new supply of colloidal silica had already undergone some harmful changes even after the comparatively short period of four months.

The fact of the barrenness of solutions in which old samples of commercial sodium silicate or not quite fresh solutions of colloidal silica has been used, is of itself a convincing proof that the temperature to which these and other tubes have been submitted has sufficed to kill any organisms that the solutions may have originally contained. While the fact that organisms are much more abundant in them than they are in fresh supplies and that they go on increasing in these old stock solutions shows that their capability of favouring mere growth and multiplication of such organisms is in no way diminished. The remainder of my stock solution of colloidal silica is clear like water, but there is now a slight sediment which on examination is found to be composed of bacteria, toruloid corpuscles, fungus-germs, and minute moulds. Numbers of such organisms may also be found mixed with the white deposit in the bottles in which the old commercial silica has been standing.

I have, moreover, inoculated the barren solutions in many of the tubes of which I have been speaking with organisms taken from the old stock supplies, or with others growing in a contaminated ammonic tartrate solution, and have found that the organisms grew and multiplied freely in these previously barren tubes—thus showing that it was not the power of nourishing organisms which had been lost in the solutions made from the old supplies, but what, owing to some change, we can only regard as the capacity for engendering them. It also explained what for a time was a great puzzle to me, that is, why solutions precisely alike in their constitution and the conditions to which they had been subjected should at first be fertile, and then, when prepared at a later date, should be barren.

From what I have said, it seems clear that it is better not to work with ordinary commercial sodium silicate which is more than twelve months old, and that the dilute colloidal silica used should be only recently prepared.†

It must be recognized also that no two samples are exactly alike,‡ so that in order to estimate the amount of the dilute sodium silicate to be used when dealing with a new supply tentative trials must be made, as described at p. 30 of *The Origin of Life*. The aim for the colourless solutions being to obtain only a quite small amount of deposit after the fluid, boiled for ten to twenty minutes,

†Looking to the uniformly successful results that I obtained when working with the freshly prepared very dilute colloidal silicic acid, it is much to be desired that others should repeat these particular experiments. Dr. Rosenheim has kindly sent me the following details concerning the mode in which, by a modification of Graham's method, he prepared the weak solutions samples of which were given to me:

"65 c.c. of Kahlbaum's sodium silicate (10 %) were diluted to 200 c.c. with distilled water, and the solution was poured into an equal volume of water containing 20 c.c. of concentrated HCl."

"A specially prepared appendix from a sheep (see *Handbuch der Biochem. Arbeitsmethoden*, E. Abderhalden, Bd. 3, p. 10) was filled with the slightly opaque solution, and suspended in the dialysing apparatus of Wiechowski (see *Ibid.*, Bd. 3, p. 177). Dialysis against running distilled water was carried on for ten days until the dialysate was perfectly free from chlorides."

The first sample given to me was, according to Dr. Rosenheim, "a pure 0.01 % solution of colloidal silica" (see *The Origin of Life*, p. 52, note 2). Kahlbaum declined to supply any such solution, partly because of its instability.

‡Quite recent experience leads me to think that the commercial product is now more variable than ever, owing, perhaps, to the fact that it is no longer much used by surgeons. Samples that have lately been supplied to me have varied very much, so that it is more than ever important to make use of recently prepared colloidal silica. (November 23rd, 1912).

has been subsequently cooled; while for the yellow solution, when cooled, the aim should be to obtain also a minute amount of deposit from a fluid having a pale port wine colour, or else (when the amount of the silicate is at times only very slightly more) a pale canary yellow colour.

After trials of this kind have been made, the worker will know how many drops of the dilute sodium silicate with which he is dealing should be used to the ounce for the yellow and for the colourless solutions respectively; and he may be fairly certain that the results will be similar for the hermetically sealed tubes after the sterilizing process, if they have been charged with similar solutions.

In the actual preparation of the fluids a certain order should be observed. Thus, for the yellow solution it is important that the liquor ferri should be added to the distilled water first, and then the dilute silicate drop by drop.

Reversing the order generally leads at once to the formation of a dense precipitate. And the changes with different quantities of sodium silicate, added at the proper time, are often very surprising, as may be seen from the following example of the results obtained during the testing of a new supply of sodium silicate. In each trial 8 drops of the iron solution were used in an ounce of water, and when the one or more drops of the sodium silicate had been added the solutions were boiled for fifteen minutes and then allowed to cool. The results with different proportions of sodium silicate were as follows:

1 : 8 Fluid colourless. Deposit red and copious.
3 : 8 Fluid slightly yellow. Deposit red and copious.
5 : 8 Fluid reddish-yellow. Deposit reddish-yellow and copious.
6 : 8 Fluid yellow and slightly clouded. Deposit very minute in amount.
7 : 8 Fluid yellow and not clouded. Deposit moderate in amount.
8 : 8 Fluid of pale drab colour. Deposit drab and copious.

This sample of sodium silicate would not yield a solution of port wine colour such as I had often obtained with previous samples. With another supply, tested on the same day, the results were equally variable but different. In charging tubes with some of the supply the results with which are given above I used a 6 : 8 combination, as the deposit, with time, always tends to increase slightly.

For the colourless solutions I have of late been dissolving the ammonic phosphate and filtering the solution first, through the finest (No. 0) Swedish filtering papers, to remove minute impurities that may be found with the crystals, before adding the dilute phosphoric acid and then the dilute sodium silicate.*

Of late, in order to be able to pursue these studies where I live, in the country and away from a laboratory, I have been boiling the tubes for twenty minutes on three successive days rather than heating them as before to higher temperatures in an autoclave or an oil bath.

(*d*) *Examination of the Solutions.*—When examining the solutions I use a pipette about 8 in. long, having a bore of 3 mm., and provided with a rubber teat at its expanded upper extremity. It is desirable to take up with the sample of sediment only a single drop of the fluid, so that when this sample is transferred to the microscope slip it may be kept together under a carefully lowered cover-glass.

The specimen is then systematically searched through, beginning at one side of the cover-glass and working regularly up and down till the whole field has been carefully examined, at first with a ⅔ in. objective, or concurrently with that and a ⅛ in. with No. 6 eyepiece—and all the time using the nose-piece freely, so as to bring the higher power into use when anything like an organism comes into view. This answers well for the detection of torulae, but of course for bacteria only the higher power is of any use.

The light in all cases requires to be most carefully adjusted so as to get the right kind of illumination; and when the organisms are scarce and minute, their recognition may be much facilitated by running under the cover-glass a drop of a freshly filtered solution of eosin or of carbo-fuchsin.

* In some experiments made in conjunction with Sir William Ramsay and Dr. A. C. Stevenson, both colourless and yellow solutions were centrifugalized for twelve hours or more in order to get rid of any organisms that the solutions might contain. The tubes charged with these solutions, after having been sealed, were boiled for twenty minutes on three successive days. Several of these tubes, which had been exposed to light or in the incubator for over six months, have lately been examined, with the result that they have been found to contain bacteria, torulae, and moulds just as freely as in other similar solutions which had not been centrifugalized.

Conclusion.

There is one difficulty of a general character applicable to all experiments of this order, though not more to mine than to those of previous workers, to which it may be well to make reference here.

Many persons find it more or less impossible to believe that bacteria, torulae, and simple moulds should be products of so-called spontaneous generation, and that for two reasons.

In the first place they are not deemed simple enough to rank as primordial living things.

But what has been said on this head by others of late makes it desirable for me to repeat what I have often said before, namely, that new-born living matter, wherever and whenever it appears, must have its first beginnings as ultramicroscopic particles, which as they grow would at last become recognizable by the aid of the microscope as very minute spherical units.† These may in some cases go on to the formation of micrococci, of bacilli of different kinds, of torulae, or of germs which gradually develop into one of the simplest moulds.

When it is said, therefore, that such organisms are not simple enough to be regarded as primordial living things, it must not be forgotten that the real primordial formations are ultramicroscopic particles, and whatever the type produced—whether minute formless masses of jelly like the Monera of Haeckel, or blue-green algoid corpuscles—they also would in each case have to commence as ultramicroscopic particles.

It seems to me quite possible that in Nature both Monera and blue-green algoid corpuscles may be constantly appearing *de novo*.[2] But that is a mere supposition devoid of all positive evidence, as it must always remain till someone may be fortunate enough—whether chemist or biologist—to hit upon such combinations of materials as will, under necessarily restricted experimental conditions, suffice to engender either Monera or blue-green algae. For whatever the future researches of chemists may achieve in the way of synthetically building up the bases of protoplasm, when it comes to the demonstration of the production of actual living matter, they could never convince themselves or the world in general that they had succeeded in their quest till they were able to produce it under such restrictive conditions as I have had to cope with in my experiments—that is within hermetically sealed vessels which, with their contents, had previously been sterilized. They, like the biologist, would have to eliminate all pre-existing life and securely guard against contaminations, and what the chemist may then produce no one can say, though he is certainly never likely to produce living matter in tangible lumps, as recent vaticinations in regard to what "the chemist is going to do in his laboratory" would seem to intimate. It may be safely affirmed that living matter, like crystalline matter, must always begin from a collocation of its elements, and then can only, after a time, reveal itself as minutest particles tending to develop in this or that manner in accordance with the extremely varied nature of the initial molecular combinations. And for our sterilized solutions we can only suppose that the conditions are such as merely to permit of the production of ultramicroscopic particles that slowly, in the course of months (rather than in a few days after the manner of infection by pre-existing organisms), develop into bacteria and torulae, though the latter have the potentiality of growing into simple moulds.‡

† When it is said, therefore, that a belief in "spontaneous generation" would tend to contradict the experience of all mankind, "My reply is that Archebiosis may be occurring all round us, and that from its very nature it must be a process lying altogether outside human experience, and never likely to come within the actual ken of man" (*The Nature and Origin of Living Matter*, 1905, p. 144). While long previous to this, in *The Beginnings of Life*, 1872, vol. i, p. 267, I described what I then termed "plastic particles" (rather than "microzymae") as primordial particles of living matter, "between $\frac{1}{50000}$ in. and $\frac{1}{20000}$ in. in diameter"; and at pp. 293–97 I described the mode in which such particles might be seen to emerge in certain solutions from the region of the invisible, and then gradually develop into bacteria.

‡ As long ago as 1868 M. A. Trécul, an eminent French authority, in an important article entitled "Observations sur la levûre de bière et sur la *Mycoderma cerevisiae*" (*Compt. rend.*, t. 67, pp. 137, 212, and 1153), brought forward very conclusive evidence showing that *Torula cerevisiae*, *Mycoderma cerevisiae*, and *Penicillium*, as he says, "ne constituent qu'une seule espèce" (since these forms were shown to be mutually convertible); and, moreover, that torulae under the conditions which he described were constantly arising *de novo*, showing themselves first as minutest particles. See also the investigations of Hector Grasset (*Etude historique et critique sur les générations spontanées et l'hétérogénie*, second edition, J. Rousset, 1912, pp. 157–159) for further light on this subject, and a simple means of proving the *de novo* origin of torulae within the grape.

What real knowledge, however, have we, apart from experimental results, entitling us to come to any definite opinion as to what primordial living things should or should not be like? We know, indeed, that primordial crystals may be either simple or of very complex forms. Rather let us be content carefully to question Nature by way of experiment, and learn from her to think less of the other objection to bacteria and torulae being accepted as veritable products of spontaneous generation—that is, simply on the ground that they are well-known forms, instead of being something new and strange.

This latter one-sided objection, strongly raised by Huxley in 1870 in an address "On the Relations of Penicillium, Torulae and Bacterium,"[3] would necessarily disappear with the proof of "spontaneous generation," because then it would at last be realized that what took place in the experimental vessels must be *much more freely occurring in the world outside*, and that the bacteria, torulae, and moulds whose appearance is so ubiquitous must be constantly *originating* as well as multiplying all around us. We should, moreover, no longer have to postulate the existence everywhere in the atmosphere of inconceivably numerous and varied germs, always ready suitably to tenant every new possibility in the way of site, however unusual it may be.* To meet such requirements the atmosphere ought to present itself as infinitely more crowded with germs of the most varied kinds than it has ever been found to be by the many persons who have most carefully examined it from this point of view.

REFERENCES.
[1] *Phil. Trans.*, 1861, p. 183. [2] *The Nature and Origin of Living Matter*, p. 145. [3] *Quart. Journ. of Microscop. Science*, 1870, p. 355.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

SCARLATINAL MEASLES.

A GOOD many cases have come under my notice during the last few years, when epidemics of scarlatina and measles have occurred at the same time, which could be described as above. The symptoms at the commencement depend on which fever has the start; in some of the cases the rash on the first day of my visit resembled scarlatina, but on the second measles. The rash when fully developed has the appearance of both combined, yet from its mottled condition one is inclined to diagnose measles. I find, however, that these cases always develop severe throat trouble, peeling, and very often Bright's disease.

About a fortnight ago I saw a case of undoubted scarlatina, and a week after the rash had disappeared well marked measles started, which proves that the two diseases can be in the system at the same time. I think this is very important, as in these cases the measles rash is often very much more pronounced than the scarlatinal rash, and the after-treatment (especially with regard to isolation and exposure to the weather) is very different.

West Hartlepool. G. F. E. MORGAN, L.R.C.P., M.R.C.S.

NECROSIS OF THE JAW FOLLOWING MEASLES.

IN the Epitome of Current Medical Literature (August 24th) Bindi refers to the rarity of necrosis of the jaw following measles. I have not here any access to works of exhaustive reference, so that I can say nothing as to the rarity of the occurrence, but if it is so rare I should like to add to the records a case which occurred in the Refugee Camp, Vredefort Road, Orange Free State, of which I was Principal Medical Officer during the war.

The patient was an infant aged 11 months, which had been attacked with measles eight days previous to admission to hospital. It was getting on, with no lung complications when the camp sister sent it in, fearing that it was developing cancrum oris, of which there had been a few cases. The left cheek was red, shiny, swollen and hard, but this condition was not confined to the soft parts of the cheek; the swelling was fixed to the maxilla, and evidently there was periostitis extending from the canine socket to between the positions of the first and second molars. An incision was made through the mucous membrane down to the bone, giving exit to a considerable quantity of thin sanious pus. Four days later the mucous membrane was found to be stripped from the alveolar margin to the extent already indicated, and the bare bone protruded. A few days later the bone seemed to be protruding more through the membrane, and was found to be quite loose and easily removed without an anaesthetic. The sequestrum was of exactly the same extent as described by Bindi, but extended a little further up into the body of the maxilla.

Bethulie, O.F.S. JOHN A. GRAHAM, M.B.

* See Fée, as cited by Hector Grasset (loc. cit., p. 37), and a much longer list given by Bouchet (*Hétérogénie*, 1859, pp. 336-339) of rare moulds found (but with constancy) only in rare and exceptional situations.

EPIDEMIC JAUNDICE.

HAVING had a good many cases of jaundice in my district during the last few months I have read with interest the notes that have lately appeared in the JOURNAL on the subject. The following four cases in a farmhouse are, I think, worthy of record. The eldest daughter had what appeared to be an ordinary attack of catarrhal jaundice towards the end of August. The attack ran the usual course, and she recovered in about a fortnight. Three weeks from the commencement of the eldest daughter's attack the next daughter (aged 24), a son (aged 20), and the youngest daughter (aged 9), were taken ill all about the same time and practically with the same symptoms—severe pains in the legs, headache, vomiting, epigastric tenderness, great prostration with a temperature of 104°. These symptoms were followed by jaundice, clay-coloured evacuations, and bile-stained urine. No enlargement of liver or spleen, as in the cases narrated by Dr. Lyons, could be discovered. The temperature became normal in about five days, and the jaundice gradually disappeared. Nausea and a great distaste for food continued for some days. In a fortnight all three patients were convalescent. Now comes the interesting part of these four cases. They had all been drinking water from a well, the sole water supply of the farm. This well is situated in the garden, and is 36 ft. away from the parish churchyard. A bacteriological examination of this water showed: *Bacillus coli*, over 1,000 per litre; streptococci, over 10,000. The bacteriologist pronounced the water "contaminated and unfit for drinking purposes." Father, mother, and two other children escaped unharmed.

Milverton, Somerset. CHARLES RANDOLPH.

A MODIFICATION OF THE BURRI METHOD OF DEMONSTRATING THE SPIROCHAETA PALLIDA.

A DISADVANTAGE of the Chinese ink method of demonstrating the *Spirochaeta pallida* is that unless the ink is prepared by centrifugalizing it, or, as Captain Frost, R.A.M.C., recommends, by the addition of tincture of iodine, the background is too coarsely granular to make the detection of *Spirochaeta pallida* easy.

I have found that a much more homogeneous field is obtained with less trouble by substituting for Chinese ink a suspension of collargol, made by adding one part of the powder to nineteen parts of distilled water, according to the makers'[1] directions. The powder is put into a black bottle (or an ordinary stoppered bottle wrapped round with carbon paper) and the water poured on it. After standing for a few minutes the bottle is thoroughly shaken, allowed to stand a few more minutes, and again shaken.

The suspension, which keeps good for months, is used for the demonstration of *Spirochaeta pallida* precisely as if it were Chinese ink; a drop of the suspected secretion and a drop of the collargol are mixed together at one end of a microscope slide, and, with the end of another slide, a thin film is spread just as in making a blood film. The specimen is examined as soon as it is dry with the aid of an oil immersion lens. The spirochaetes appear as delicate spirals on a reddish-brown field which is almost perfectly homogeneous.

L. W. HARRISON, M.B., Major, R.A.M.C.,
Pathologist, Military Hospital, Rochester Row.

[1] Chemische Fabrik von Heyden.

Reports
ON
MEDICAL AND SURGICAL PRACTICE IN THE HOSPITALS AND ASYLUMS OF THE BRITISH EMPIRE.

ST. PANCRAS SOUTH INFIRMARY.

A CASE OF PUERPERAL ECLAMPSIA, COMMENCING WITH AMAUROSIS: RECOVERY.

(Reported by Rose Jordan, M.D.Lond., Locumtenent Medical Officer.)

J. B., aged 19, unmarried, and pregnant for the second time, was admitted from the workhouse to the lying-in ward on September 4th, 1912, at 4.30 a.m., when she first complained of pains. At 4.45 a.m. she was delivered of a female child weighing 7 lb. 10 oz. The labour was easy and normal and the loss moderate.

She appeared perfectly well until 5.10 p.m. (twelve and a half hours after delivery), when she suddenly became blind; she was unable to distinguish light from darkness, and complained of severe headache. A catheter specimen of urine withdrawn at 5.20 p.m. contained a thick cloud of albumen, but no casts and no deposit. An enema was given, but returned clear. At 7.10 p.m. she vomited. At 7.30 she had a typical eclamptic convulsion, which was treated by chloroform inhalation. At 8.7 p.m. she had a second convulsion, more severe than the first, the face becoming cyanosed. At 9 p.m. the stomach was washed out by means of a rubber tube and glass funnel, a solution of sodium bicarbonate, one drachm to the ounce, being used; some greenish fluid was withdrawn; six drachms of magnesium sulphate dissolved in one ounce of water were left in the stomach.

At 9.10 p.m. the patient had a convulsion; blankets and hot bottles were packed round her. 9.55 p.m. A convulsion; 1 pint of normal saline solution was infused under the left breast. 11 p.m. She vomited greenish fluid; pulse 102.

Convulsions followed at 11.45 p.m., and on September 5th at 12.35 a.m., 1.15 a.m., 1.45 a.m., 2.30 a.m., and 3.5 a.m.

At 4 a.m., the bowels not having acted, a drop of croton oil was placed on the back of the tongue. At 4.10 a.m. a hypodermic injection of morphine sulphate ½ grain was given. At 4.20 a.m., the patient being restless, chloroform inhalation was repeated and one pint of normal saline solution was infused under the right breast.

At 5.50 a.m. she had another convulsion, and again at 9.55 a.m. Temperature 98° F., pulse 88. 10.5 a.m. Hypodermic injection of morphine sulphate ¼ grain. Still no action of bowels, so croton oil repeated. 11 a.m. Continuous rectal infusion of normal saline solution begun and continued until 12.25 p.m., but not well retained.

At 11.3 a.m. convulsion; vomited greenish fluid. 11.20 a.m. Convulsion; very cyanosed. 12.30 p.m. Convulsion; chloroform given continuously.

At 1.40 p.m. the patient was removed on a stretcher to a ward of the South Infirmary, being kept under chloroform during the transfer; on arrival there a vapour bath at 120° F. was given for half an hour; the skin reacted well.

Up to this point she had had fifteen convulsions in six hours, and had remained unconscious during the whole time.

At 2.45 p.m., convulsion; chloroform inhalation recommenced; vomited about 4 ounces of greenish fluid. 3 p.m. Hypodermic injection of 5 minims of morphine given. At 3.30 p.m. the stomach was again washed out, and 2 drachms of brandy containing 1 minim of croton oil were introduced. 5.15 p.m. One pint 16 ounces of saline infused under the left breast. The patient remained quiet until 7.45 p.m., when she became conscious; she then passed 14 ounces of urine. 8 p.m. Bowels still obstinately constipated; olive oil enema given without result; vomited about 1 ounce of yellowish fluid. 8.30 p.m. Slept for an hour. 9.35 p.m. Drank 1 ounce of hot water, but vomited immediately. 10 p.m. Temperature 98.4°, pulse 92, respiration 24; bowels opened for the first time, relaxed; took sips of hot water. 6 a.m. Oil enema given, followed by soap enema, with fair result. During the night she took 15 ounces of water and 30 ounces of imperial drink.

September 6th: Vision not returned.

September 7th: Vision gradually returning, still misty. The patient was fully conscious, but had no memory of recent events. Began to suckle baby.

September 8th: Vision normal.

Urine.—On September 9th (five days after the commencement of eclampsia) the urine contained no albumen. On September 14th a cloud of albumen was found, and on September 20th a trace, the patient also complaining of headache during this period. After September 20th the urine remained free from albumen.

During her sojourn in the South Infirmary the bowels were never opened except by enemata, being quite unaffected by aperients. Ophthalmoscopic examination of the fundi showed nothing abnormal. Her mental condition was curious, and she appeared to have lost all memory of both the present and the previous confinements. Yet she was perfectly capable of looking after, feeding, and washing both herself and her baby. The puerperium was uneventful.

Reports of Societies.

ROYAL SOCIETY OF MEDICINE.

Surgical Section.

Tuesday, November 12th, 1912.

Mr. G. H. Makins, President, in the Chair.

Sarcomata and Myelomata of the Long Bones.

Sir Alfred Pearce Gould (speaking on the clinical diagnosis of sarcomata and myelomata of the long bones) said that a sarcoma was distinguished by being a single firm, fixed lump, well defined, with an abrupt edge not nodular or lobulated. Periosteal sarcomata were globular and ensheathed the bone, and were liable to chondrification and calcification. Exostoses were painless and pedunculated, benign tumours with a broad attachment, especially if they happened to invade the bone, were extremely difficult to diagnose. Central sarcomata destroyed bone, but were rare at the epiphyses. Myelomata occurred at the epiphyses, were less rapid in their growth, and did not penetrate outside the bone or burst through into the joint. They were globular, and egg-shell crackling could be obtained over them; they did not extend along the shaft, and no new bone was laid down over them, as occurred in tubercle, syphilis, and serous osteo-myelitis. Pulsation occurred in the myelomata and the central sarcomata. Fluctuation occurred over the soft growths, but their varying consistency served to distinguish them from an abscess or a cyst.

Sir John Bland-Sutton said that even after a microscopic examination of a tumour he sometimes hesitated in making a diagnosis, and it was difficult to account for their varying malignancy. Some sarcomata, even after an early high amputation, recurred in a few weeks, whilst others remained free from secondary deposits for years. Myelomata occurred near the epiphyses of long bones in early life; they caused expansion of the bone, were very vascular, and liable to haemorrhagic changes. They were maroon in colour, but other red tumours occurred which were similar except in structure. The same parts were liable to the formation of benign cysts which might be due to spontaneous cure in a myeloma or changes in a perithelioma or cavernous naevus. There was no reason why cavernous naevi should not develop in the vascular medulla.

Sir Frederic Eve said he performed interscapulo-thoracic amputation for periosteal sarcoma of the upper end of the humerus. Periosteal sarcoma of the lower end of the femur he removed by amputation at the hip; he used the anterior racquet method, and dissected out the femoral glands and the muscles from the os innominatum; cocaine should be injected into the terminal nerve trunks to lessen shock. He had performed eleven amputations at the hip without a death. For periosteal sarcoma of the lower end of the tibia he amputated through the knee-joint. He agreed with the late Sir Henry Butlin that the central sarcomata were of mild malignancy owing to their having a bony capsule. If they had burst through the bone their malignancy was equal to that of periosteal sarcoma, and then had to be treated in the same way. Myelomata were sometimes of equal malignancy to the periosteal sarcomata. Three out of five of Butlin's cases died from secondary metastases. He thought that the malignancy of myelomata was greater for the proximal than the distal, and it depended more on their site than their histology. He performed erasion if the bony walls were thick, and injected the cavity with paraffin (melting point 110°), or used pieces of bone from a recently amputated limb. He resected the affected portion if the bony walls were thin. The tibia could be replaced by a portion of the fibula (autoplasty); in other situations he used bone from a

recently-amputated limb or from a corpse (bone grafting). It was often advisable to defer operation for microscopy; the infection from a preliminary incision had been exaggerated. He had treated 10 cases with Coley's fluid—7 without result, in 1 case the growth nearly disappeared, in 2 the secondary deposits became smaller. He did not recommend its use as a prophylactic to secondary deposits or for operable cases.

Mr. Hey Groves described 3 cases and thought it was open to question whether high amputation was ever justifiable for sarcoma. Probably the successful cases were ones which local removal would have cured.

Mr. R. C. Elmslie thought radical operation should only be performed when the diagnosis was certain; the clinical and *x*-ray appearances were quite sufficient to make a certain diagnosis between benign cysts and central sarcomata. If an endosteal sarcoma had not burst through the bone it should be regarded as a simple tumour until it had been proved to be otherwise. Exploratory incisions were of great use in diagnosis provided they went deep enough.

Further discussion was then adjourned, to be resumed on November 19th, when Mr. Gask demonstrated a table of 61 cases treated at St. Bartholomew's Hospital from 1902–1911. The final results substantially agreed with Butlin's tables, except that the mortality of the operations themselves had been greatly diminished. The prognosis and treatment of the myeloid sarcomata were good; of the 10 cases only one recurred. Sarcomata that contained cartilage had a relatively lower malignancy. The prognosis for periosteal sarcomata was very bad. In only 13 of the cases was there a history of injury, and it was often very slight. Mr. A. Reid said that the characteristic *x*-ray features of periosteal sarcomata were that a limited area of bone was affected, no new bone was laid down, spicules extended out at right angles to the shaft; later dense masses were formed around and along the shaft of the bone, though its continuity could still be made out. Mr. Shaw said that myelomata were practically benign. A section for microscopy should always precede amputation. All malignant cases should be registered so that the final results could be traced. Mr. Morton (Bristol) thought that myeloid sarcomata should be excised and the ends of the bones joined together, unless precluded by extreme shortening, for a more useful limb could be obtained by ankylosis than by bone grafting. Butlin's figures showed the deadly nature of periosteal sarcoma, and he thought that the results obtained by excision were as good as those obtained by high amputation. Mr. John Murray and Mr. Lister recorded a case of fractured humerus from a hydatid, in which the *x*-ray appearances were similar to those of an endosteal sarcoma. Mr. Ironside Bruce showed a series of radiograms illustrating the various diagnostic points; one of scurvy rickets in a single bone resembled a periosteal sarcoma. Mr. S. W. Scott said that the rate of bone destruction and repair indicated the degree of malignancy. The repair in myelomata was shown in the radiogram by the bone trabeculae, the denser these trabeculae the slower the growth. Repair in the periosteal sarcomata was shown by the periosteal striations. Mr. Orton recorded a case where the tumour disappeared under *x* rays; secondary growths afterwards occurred in the liver, but these also disappeared under *x* rays; the patient died later of secondary deposits elsewhere. Mr. Makins, in winding up the discussion, said he thought that the term "myeloid sarcoma" should be retained, as these growths occasionally led to secondary deposits. He was struck by Sir John Bland-Sutton's suggestion that benign cysts might be due to spontaneous cure of a myeloid sarcoma.

Obstetrical and Gynaecological Section.

At a meeting on November 7th, Dr. Amand Routh, President, in the chair, Dr. G. R. Drummond-Maxwell, after recording a case of *Eclampsia successfully treated by Caesarean section*, formulated the following indications for this operation in eclampsia: (1) Fits occurring in a primigravida; (2) onset of fits with no signs of the start of labour; (3) a rapid succession of fits where consciousness is not regained and coma is deepening; (4) failure of advance of cervical dilatation after several hours of an expectant attitude with the prospect of many hours' delay before the second stage is reached; (5) absence of any definite signs of improvement after eliminative treatment has been carried out for several hours. The presence of all these indications constituted a case of such gravity as to render the operation justifiable. Dr. J. M. Wyatt drew attention to the operation for prolapse devised by Le Fort in 1877, the principle upon which it was based being that if the vaginal walls could be kept in constant contact with one another prolapse could not occur. In 1889 André collected 40 cases treated by Le Fort's operation, 35 of which were successful. In the author's opinion the operation was of great value in cases of procidentia in old people where any form of pessary failed to keep the womb in position, and where laparotomy for fixation was contra-indicated. He then described the method of performing the operation as carried out at St. Thomas's Hospital by Dr. Tate, and recorded 8 cases, in 6 of which the after-history had been traced, and the result was successful.

Section of Otology.

At a meeting on November 15th, Dr. Dundas Grant, President, in the chair, Mr. Richard Lake and Mr. Ferguson Penny showed 2 cases of *Vertigo*, in which the blood pressure was very low, and in which, after producing rotation, the reactionary vertigo was excessive. The first was a man, aged 55, who had had slight bilateral deafness and tinnitus for twenty years. There had been no discharge, and his drum membranes were only slightly retracted. His giddiness recently had increased, so that at times he staggered and found difficulty in walking straight. Apparently he was a neurotic subject. On rotating him ten times in twenty seconds he had an intense vertigo, accompanied by vomiting; and the same symptoms were brought out by the application of the caloric test. After rotation the blood pressure was only 105. He was treated with half-drachm doses of ernutin thrice daily, with the object of raising his blood pressure, and since that treatment there had been no further vertigo. The dose was gradually reduced, and since its cessation the patient had remained well. The second patient was a woman, aged 49, who had had eight years' deafness on both sides, with tinnitus worse on the right. There had been no discharge, but she had paracusis Willisii. At the hospital she could only walk straight by fixing her eyes resolutely on an object in front of her. Rotation in the usual way brought on an excessive reaction, including nystagmus. After rotation the blood pressure was only 105. She was given strychnine and atropine, but four days later she reported that this made her worse. A month after the strychnine and atropine was commenced she was put on ernutin, three daily doses of ½ drachm; and after only two days she reported improvement—actions which previously had provoked severe vertigo now failed to do so. Temporary discontinuance of the drug resulted in a return of the symptoms. Dr. Grainger Stewart had reported that he could find no nervous disease in the patient. In reply to questions, the exhibitors said they knew of no cause for the low blood pressure, and the drug caused an immediate rise in that pressure. Dr. Dan McKenzie pointed out the possible danger of administering adrenalin in a case of high blood pressure, and said that careful watch on that pressure should be kept when treating a case of vertigo. Dr. H. J. Davis showed a case of *Labyrinthine vertigo* in a woman, aged 33, whose cochlear nerve was found to be functionless, and probably also the vestibular nerve. The opinion expressed was that a tumour implicated the auditory nerve before its entry into the internal ear. The Wassermann test gave a negative result.

Section of Diseases of Children.

At a meeting on November 22nd, Mr. A. H. Tubby, President, in the chair, Dr. Leonard Guthrie, in a paper on *Epidemic catarrhal jaundice*, said that during the months of November and December, 1911, and January, 1912, he had met with 10 cases of jaundice in children, whose ages ranged between 3 and 11 years. Two or more members of the same family had been affected in several instances, and the patients, with two exceptions, had lived in adjoining districts. Seven of the patients were related as brothers or sisters. The liver was enlarged in six cases, and greatly so in four. Apparently all cases began with definite malaise, and

probably slight pyrexia, but none of the patients was seriously ill. No relapses occurred, and recovery was uneventful in all. Similar small and mild epidemics of catarrhal jaundice had been especially frequent during the last three years in this country and in many other parts of the world. A distinction should be drawn between it and Weil's disease. It was probably air-borne. The mortality was very low, but deaths had occurred in other countries. The symptoms and pathology of the fatal cases were practically the same as in Weil's disease and in acute yellow atrophy of the liver. Epidemic catarrhal jaundice was regarded as a form of hepatitis resembling mumps in some particulars, and not due merely to mechanical obstruction of the common bile duct consequent on gastro-duodenal catarrh. Although no fatalities had been recorded in this country, the disease might at any time assume more serious proportions. The prognosis in any case should be guarded, and the question, Is jaundice catching? could no longer be answered by a direct negative. It was probably most communicable in its early febrile stage. The following were among the cases and specimens exhibited:—Dr. J. W. CARR: Partial *Hemiatrophy of the face and tongue* in a boy aged 9. It was accompanied by sclerodermia of the skin below the jaw. Mr. L. E. C. NORBURY: Spina bifida (meningomyelocele) treated by operation at 5 weeks old. When 16 months old no hydrocephalus had resulted. Dr. ERIC PRITCHARD and Mr. DOUGLAS DREW: *Oesophageal stricture* in a boy aged 2. He could not swallow solid food. A skiagram showed a dilated oesophagus between the level of the suprasternal notch and xiphisternum and a stenosed portion below. Dr. G. A. SUTHERLAND: *Cerebral non-development* in a baby aged 7 weeks. It produced a spastic condition somewhat resembling tetanus, cyclic breathing, attacks of tachypnoea, fits of causeless crying ending abruptly, spells of yawning, twitching, but no definite convulsions. Dr. J. D. ROLLESTON: Pharynx and larynx from a fatal case of haemorrhage from the throat. Infection unknown. Dr. C. P. LAPAGE: Primary *Carcinoma of the liver* in a boy aged 6 with secondary deposits in the lung. Both primary and secondary growths secreted bile.

MEDICAL SOCIETY OF LONDON.

Monday, November 25th, 1912.

Sir W. WATSON CHEYNE, Bart., President, in the Chair.

Exhibition of Clinical Cases.

THE following cases, amongst others, were shown:—The PRESIDENT: Two cases illustrating the formation of a new joint. The first case was that of a girl, aged 12, who had suffered from ankylosis of the right hip-joint following tuberculous disease. Arthroplasty was performed on the lines of Murphy's operation. This consisted in clearing out the contained caseous material and paring the ridges of the acetabulum and the femoral head in order to allow of good apposition. As part of the operation, a fascial flap was folded round the head and stitched in position before it was returned to the acetabulum. The ultimate result was to obtain an almost perfectly mobile joint. The second case was one of ankylosis of the elbow in a girl, aged 15, following acute suppurative arthritis. An excision of the elbow-joint had been performed, retaining the radial head, and ankylosis had resulted. Arthroplasty after Murphy's method was done. Fascial flaps were turned in between the humerus and bones of the forearm and stitched in position. A piece of fascia was also wrapped around the head of the ulna. A most excellent elbow-joint resulted. Dr. F. S. PALMER: Two cases of Friedreich's ataxia in brother and sister, aged 16 and 18 respectively. They were well-marked examples of the condition. The boy showed also marked atrophy of the arm, pectoral girdle and hand muscles resembling progressive muscular atrophy. The interesting features in the girl's case were hyperextension of some of the fingers, bitemporal pallor of both optic discs, and electrical changes in the muscles. Dr. F. J. POYNTON: A case of congenital heart disease, cystic liver, and cystic kidney in a man aged 32. Mr. PAUL B. ROTH: A woman, aged 45, with either congenital syphilitic osteo-periostitis or osteitis deformans of the right tibia. Mr. A. E. BARKER: Four cases illustrating septic diseases of the knee-joint of various origins. Case 1 was apparently due to pyorrhoea alveolaris. Diplococci, streptococci, and *M. catarrhalis* were grown from the right knee, but nothing from the left. Case 2: The sources of infection found were pyorrhoea alveolaris and a boil on the arm. Diplococci had been grown. Case 3: Suppuration of the subdeltoid bursa occurred, and the pus evacuated from it swarmed with *Diplococcus pneumoniae*. The patient had had pneumonia ten days before. Case 4: Only source found was again pyorrhoea alveolaris.

GLASGOW MEDICO-CHIRURGICAL SOCIETY.

AT a meeting on November 15th, Dr. FREELAND FERGUS, President, in the chair, the following were among the exhibits:—Mr. HENRY RUTHERFURD: (1) A gillie, aged 33, who, by *Rupture of the ligamentum patellae* in August, 1909, had been seriously handicapped in walking, rowing, etc. A plastic operation performed in October, 1910, whereby the quadriceps muscle was split and a portion brought down and fixed to the tibia, had given a very satisfactory result. (2) A man operated on six weeks ago for habitual *Outward displacement of the patella*. Removal of the attachment of the ligamentum patellae to the inner side of the tibia had resulted in much greater security in walking. Mr. Rutherfurd also described the following, among other cases of *Acute intestinal obstruction*: (1) A boy aged 12, in whom the obstruction had resulted from an irreducible intussusception. An ileo-colic anastomosis was effected and the boy did well for a week, but obstruction recurred, and it was found that the entire intussusceptum had sloughed. Death ensued from inanition. (2) A woman in whose case a fall from a chair was followed in three days by acute intestinal obstruction. This was relieved by making an artificial anus in the caecal region. Two months later the abdomen was reopened, and, the bowel being found normal, the artificial anus was closed. A year afterwards the patient was in excellent health. Mr. ALEX. MACLENNAN reported the following, among other cases: (1) *Chronic pancreatitis* in a woman aged 34, operated on in January, 1911, for removal of gall stones. These, with much gall-stone sand, were removed and the gall bladder excised. The pancreas was found enlarged and of stony hardness, and microscopic examination of a small piece removed showed marked interstitial fibrosis with partial atrophy of the gland elements. (2) *Acute gangrenous pancreatitis* in a woman aged 59, with a history of old-standing constipation, abdominal distension, and epigastric tenderness, and of more acute pain with bilious vomiting and shivering for about a fortnight before operation. A diagnosis was made of acute pancreatitis and cholecystitis. The thickened and adherent gall bladder was excised, and the pancreas, which was greatly enlarged, livid, and with necrotic patches, was punctured with forceps in several places and bled freely. Packing was left in for six days. Union was delayed beyond the tenth day, a circumstance apparently to be associated with the presence of fat necrosis. The patient ultimately made a good recovery. Dr. W. F. GIBB showed a young girl from whose biceps muscle he had removed an unusual tumour about the size of a hen's egg. The tumour, which was exhibited, was provisionally named a striped myoma, but its exact pathology had not yet been wholly determined.

BRISTOL MEDICO-CHIRURGICAL SOCIETY.

AT a meeting on November 13th, Dr. WALTER SWAYNE, President, in the chair, Mr. ELWIN HARRIS, recording a case of *Congenital pyloric stenosis* which had died suddenly while under medical treatment, expressed the opinion that despite statistics to the contrary, operation should be performed more frequently. Dr. LAVINGTON advocated early operation, and pointed to the presence of fatty stools as a point in diagnosis, owing to the loss of the gastric acidity as a stimulus to the pancreas. Dr. STACK considered obstinate cases of vomiting in breast-fed infants usually due to pyloric stenosis. Dr. EDGEWORTH pointed out that the high mortality of operation cases was due to its limitation to the worst cases. Dr. MICHELL CLARKE described a case of *Pyocyaneus septicaemia*, in which the organism had been isolated from the blood and faeces during life. The symptoms were mainly meningeal in type, but there was no meningitis *post mortem*, and no

primary source of infection could be found. Dr. SCOTT-WILLIAMSON was of the opinion that *B. pyocyaneus* was not commonly found as a primary, but frequently as a secondary, infection. Drs. MUNRO and NIXON agreed that infections by this organism were among the most favourable for treatment by vaccines. Dr. EDGEWORTH stated that he had cured a case of ulcerative colitis by a vaccine of *B. pyocyaneus*. Dr. J. O. SYMES, in a paper on a case of *Rheumatoid arthritis* in a boy aged 4, characterized by a chronic course with intermittent fever, rigidity of spine, and knees with articular and periarticular swelling and much muscular wasting, pointed out the close relations between rheumatoid arthritis and rheumatism. This was exemplified in this case by the occurrence of crops of subcutaneous nodules, and the isolation of the rheumatic diplococcus from the blood, spleen, and a lymphatic gland. Dr. ALEXANDER advocated the use of sulphur in large doses for cases of rheumatoid arthritis. Dr. CAREY COOMBS agreed that pathologically and clinically cases of rheumatism and rheumatoid arthritis sometimes merge. Dr. NIXON regarded the case as rather one of myositis fibrosa, the changes being mainly periarticular. Dr. FORTESCUE-BRICKDALE, in a paper on *Gastric superacidity*, expressed the opinion that hyperchlorhydria was usually the result of a pathological condition, and seldom, if ever, a pure secretory neurosis.

LEEDS AND WEST RIDING MEDICO-CHIRURGICAL SOCIETY.

AT a meeting on November 22nd, Dr. JOSEPH DOBSON, President, in the chair, Dr. BEDFORD PIERCE read a paper on *Psycho-analysis*, outlining its principles, and criticizing it as a method of diagnosis. In the discussion which followed, Dr. DEVINE urged its value both in diagnosis and treatment. Dr. BOTHAM was of opinion that unless the mental attitude of the patient were changed in the process of psycho-analysis, further treatment was necessary in the direction of re-education. Dr. R. A. VEALE showed a specimen of *Malignant disease of the liver and trachea*. The growth was exceedingly vascular, and there had been spontaneous rupture of the liver during life. Histological examination proved the tumour to be an endothelioma. Dr. BARRS showed a patient suffering from intracranial disease, in whom there were headache, double optic neuritis, and attacks of typical Jacksonian epilepsy, with indications pointing to a lesion in the neighbourhood of the left motor area. A *Decompression operation* had been performed by Mr. J. F. DOBSON, who had removed a portion of bone in the left temporo-parietal region, without, however, opening the dura mater, and marked amelioration of symptoms had resulted. Subsequently, skiagrams had been taken by Mr. L. A. ROWDEN, and these were exhibited on the lantern screen. They showed a dark shadow of considerable size, apparently caused by a tumour springing from the inner face of the right temporal bone, and in Mr. Rowdon's opinion probably of the nature of an exostosis. Mr. W. THOMPSON showed a case of *Spontaneous fracture* of the radius and ulna, and another of spontaneous fracture of the femur. Syphilis was probably the responsible cause in both instances.

INFUSION ANAESTHESIA.

OUR report of the remarks made by Mr. H. Edmund Boyle in the recent discussion on infusion anaesthesia at the Hunterian Society (BRITISH MEDICAL JOURNAL, November 23rd, p. 1473), misrepresented his views in an important particular. He did not emphasize the alleged advantages of infusion anaesthesia in large operations about the mouth, but criticized them. In such operations it was essential to guard the patient's larynx, and the anaesthetist was not in a position to do this when securing anaesthesia by an infusion method. The right method in such cases was to perform a preliminary laryngotomy and pack the pharynx, as suggested by the late Sir Henry Butlin. If to the laryngotomy tube were then added an extension devised by the speaker and an anaesthetic administered through it, the anaesthetist could pay full attention to the anaesthesia and yet keep out of the way of the operator.

THE new Berlin crematorium will probably be in working order on December 1st. The municipality of Freiburg in Baden has sanctioned the erection of a crematorium.

Reviews.

DR. FARQUHARSON'S REMINISCENCES.

DR. FARQUHARSON is an old parliamentary hand, and therefore his pictures of the scenes he has witnessed and his descriptions of the machinery of parliamentary life could not fail to be interesting. He may be congratulated on the great success of his former volume, *In and Out of Parliament*, and the public has also reason to be satisfied, as it is this success that has led him to gather more memories from the same field.

His new volume,[1] which has been honoured by the acceptance of His Majesty the King, is written in as racy a style and as genial a spirit as the previous one. Dr. Farquharson tells us at the outset that his freedom from official relations to his old political leaders enables him, whilst retaining his former allegiance, to take a somewhat impartial view of their proceedings and to sprinkle praise and blame pretty equally along both front benches. Although Dr. Farquharson makes a declaration of impartiality, it is easy to see to which side his inclinations lean, and his personal feelings amusingly come through the judicial righteousness in which he has clothed himself as with a garment. He takes care that the Tory dogs do not have the best of it. This is only to say that he is human, and it is the relish of humanity that makes a book living. If, like Renan, though in a different way, he is *ondoyant et divers*, it is this very quality that makes the charm of the book. It is eminently readable.

Dr. Farquharson truly says it is only one who has spent a fair period of his life, as he has, in the House of Commons who can actually describe its inner workings. We may add that as of recent years the composition and general tone of the House have materially changed, his descriptions must be taken as applying to the quarter of a century or so in which he sat in that assembly. He begins by discussing the best way in which a man of ordinary intelligence can qualify himself to serve his country in Parliament. As a matter of practical political equipment he gives a very high place to a legal training. The habit of mind fostered by a study of the law enables a man to grasp quickly the small details in bills invented by lawyers. Dr. Farquharson, although—or, perhaps, because—he was medical officer to a great public school, seems to have a poor opinion of the training received there or at the universities. His estimate is somewhat discounted by the fact that it appears to be limited to "the average and undistinguished public school boy," and to "that even more helpless product of civilization, the pass man of Oxford or Cambridge." It is a curious commentary on this opinion of Dr. Farquharson that not a few of our statesmen at the present day, as in the past, have been quite undistinguished both at school and at the university. In spite of this there is a largeness of outlook, a balance of mind in these men, that are conspicuously lacking in other political leaders whose education has been in a narrower sphere.

The thing most fatal to success in the House of Commons, Dr. Farquharson assures us, is to be a prig, "which has been described as an animal over-stuffed for its size." His experience is that men of affairs who have been working at something definite, and who know something at first hand, and can tell it simply and practically, are most likely to get a hearing. He instances several men who made their mark in Parliament without academic training. Without wishing in any way to detract from the merits of such men, we would ask whether the dignity of Parliament would not be better upheld, and its work better done, by men who had received the education which teaches a man, in the words of John Henry Newman, "to see things as they are, to go right to the point, to disentangle a skein of thought, to detect what is sophistical, and to discard what is irrelevant"; which "prepares him to fill any post with credit, and to master any subject with facility; shows him how to accommodate himself to others, how to throw himself into their state of mind, how to bring before them his own, how to influence them, how

[1] *The House of Commons from Within, and Other Memories.* By Right Hon. Robert Farquharson, P.C., M.D., LL.D. Author of *In and Out of Parliament*. With a sketch of the author (never before published) by J. S. Sargent, R.A. London: Williams and Norgate, 1912. (Med. 8vo, pp. 256. Price 7s. 6d. net.)

to come to an understanding with them, how to bear with them." Neither the *doctrinaire* nor the bigot is exclusively a product of academic training.

Dr. Farquharson expresses his opinion with the utmost frankness on all manner of political questions. Throughout his parliamentary career he never allowed the doctor to be submerged in the politician; he always remained loyal to his profession, and lost no opportunity in doing what he could to promote legislation on matters as to which his special knowledge enabled him to speak with authority. Debates on the lunacy laws gave him the opportunity of comparing the Scottish arrangements most favourably with the English. He was a consistent advocate of granting substantive rank to the officers of the Army Medical Department; he also strongly urged the better feeding and treatment of recruits and soldiers. He feels bitterly about the conduct of the Government at the time of the South African war, when Mr. Burdett Coutts, who, he says, had seen very little of the actual state of affairs, delivered a violent tirade against the Army Medical Department. The Government did not see fit to defend the doctors, but asked Dr. Farquharson to move the adjournment. He went down fully prepared, but his motion was blocked by a satellite of Mr. Burdett Coutts. He denounces this as a cowardly bit of work done in the interest of the Government, who could not face the exposure which he was ready to make of their total want of preparation for the sick, and who made the doctors, not for the first time, the scapegoats for their obstinacy and ignorance. He adds if he had time and space he could say a great deal more on this tempting subject, for it is one that touched him deeply as an old member of the service. We may be allowed to say that we wish he had devoted to this subject some of the space which he has given to the number of meals consumed in the House and the amount of postal business transacted there.

For six years Dr. Farquharson was in charge of the private business of the House, which gave him a kind of semi-official status, but his crowning honour was when he was unanimously elected chairman of the Scottish Liberal members, a position which he held very successfully till his retirement. On reviewing his political career he cannot, he modestly says, associate it with anything of importance. He passed no bill into an Act, and his name is associated with no measure or amendment. In his reference to this we think we perceive a note of regret. Yet he did not, like Gibbon, sit for years through the most important debates without finding the courage or the talent to speak in the House. And he may well be proud of the letter from Sir Henry Campbell-Bannerman read at a dinner given on the occasion of the formal termination of the parliamentary career of the Laird of Finzean. C. B. then said:

> The little friendly troop of honest Scots will not seem itself in future without "the doctor." His genial temperament, his courteous and kindly demeanour, his cheerful spirit, his keen interest in all public affairs, which was guided by a good share of national common sense—these good qualities attracted the affection of us all.

The feelings of his constituents were shown by the presentation of a magnificent testimonial subscribed for by Liberals and Conservatives alike.

Dr. Farquharson devotes a chapter to the passing of the private member, who, he says, owing to the growth of Cabinet power and official influence, will become as extinct for all practical purposes as the dodo. He gives an amusing description of the numerous ways in which private measures may miscarry. After all, however, as he explains, the greatest enemy of the private member is his own class.

> The wearisome iteration and needless prolixity with which they debate wretched points of parochial detail, the utter want of proportion and selfish disregard for the rights of others which distinguish too many of what I may call, with or without offence, the crank brigade, contribute largely to the utter discouragement and despondency which seizes the new member and is never quite absent from his mind until he learns philosophy and cultivates a thick skin.

Question time, however, gives the private member his chance. Dr. Farquharson is quite sure that some members greedily search the morning papers to pick up some peg on which to hang a question, and whenever any great national disaster or important event takes place there is a wild rush and scrimmage to be the first to heckle Ministers. Another way of attracting attention commonly resorted to years ago was to point the moral by the exhibition of actual specimens. Dr. Farquharson believes that he was a pioneer in the method when he presented to the House a bottle containing the white and silvery ashes of a cow to show what a clean and even artistic process cremation really is. A misprint in an evening paper gave the incident special prominence, for it stated that the remains were those of a "count"! The demonstration was at any rate more effective, if less dramatic, than Burke's dagger. Dr. Farquharson is no lover of the Labour member as such, and he has a qualified admiration for the Irish member. For cranks and faddists he has a hearty dislike. He condemns the payment of members of Parliament.

A chapter is given to the question of suffrage for women, to which Dr. Farquharson is whole-heartedly opposed. He gives his reasons for the belief that is in him with a vigour of which we will only give one specimen:

> And worst of all the strain of hysteria runs through their minds when they become excited or overwrought, and makes them an easy prey to impostors of all kinds. If there is any possible bit of quackery which the mere man sees through at a glance, *cherchez la femme* and you will generally find her there or thereabouts.

This, we suppose, is one of the thunderbolts which he warns the reader at the outset he proposes to launch with partisan fury. We simply quote it as the expression of his opinion.

Of the speakers whom he has heard he naturally has much to say. We read with interest that the House always used to fill when Playfair was up, and Dr. Farquharson has heard him with delight expatiate lucidly on margarine, horseflesh, vaccination, and kindred topics, which would be the despair of the ordinary orator. Michael Foster was held in universal respect, and "all listened with delight to his rugged talk and the hearty staccato laugh which was the essence of the man." A graceful tribute is paid to Lord Ilkeston. The book is full of effective thumbnail sketches of men he has known or seen flit across the parliamentary stage.

The final chapter is entitled "How to Obviate the Tendency to Death." It is full of the ripe wisdom of experience expressed in a manner all the more convincing by reason of its moderation. We lay down the book with a feeling of regret that there is no more of it. As we understand that the demand for it is already very large, we hope this second success will encourage Dr. Farquharson to a fresh deliverance. It is a relief in these days of political fanaticism, post-impressionist art, and euphuistic literature to turn to these records in which the author, while telling of public work, gives a delightful portrayal of himself. No one can read this *Robert Farquharson intime*, as the French would call the book, without feeling the truth of the words, quoted above, in which he was described by his old political chief. We are sure that any who may be induced by this notice to read the book will thank us for the introduction to a singularly attractive personality.

THE NATURE AND METABOLISM OF FATS.

IN a monograph of 138 pages Professor LEATHES describes one field of biochemical study, that occupied by *The Fats*.[2] The early chapters give a detailed account of the fatty acids, glycerol and the glycerides, other alcohols and their fatty esters, and of certain more complex compounds of fatty acids, such as lecithin and cerebrone. For the last class no proper nomenclature has existed, but now that it is possible to define the common features of some of these substances, the author expresses the opinion—with which we agree—that the existing terminology, including words like "phosphatides" and "lipoids," cries aloud for extermination. For compounds of fatty acids containing phosphorus and nitrogen, such as lecithin and kephalin, the term "phospholipine" is suggested, the termination implying a basic character and the presence of nitrogen, the rest of the word indicating the fatty acid radicle and phosphorus. Similar compounds, containing nitrogen but no phosphorus, are named "lipines." Some lipines are combined with galactose, and are therefore called "galactolipines"; cerebrone and the cerebrins would be included in this term. A description is given of the various methods used for the extraction and estimation of fats, including the modifications adopted

[2] *The Fats*. By J. B. Leathes, M.A., M.B., F.R.C.S. London: Longmans, Green, and Co. 1910. (Roy. 8vo, pp. 144. 4s.)

for the various tissues and for the determination of the melting point, acid value, saponification value, iodine value, and certain newer constants.

The volume concludes with a good chapter on the physiology of the fats. The modern views are fully yet succinctly stated, but so impersonally that the reader would not realize how much of our knowledge of the elaboration of fats before they are oxidized we owe to Professor Leathes and those who have worked with him. The author has not adopted the ancient plan of describing the so-called classical experiments in order to discredit them. Nothing but the living work on the subject finds a place.

The likelihood that fats may be converted in the body to carbohydrates, which is strongly supported by the low respiratory quotients observed by Pembrey in hibernating animals, and by the high dextrose-nitrogen ratio observed in diabetes mellitus, is discussed with caution, but it is admitted that there must be stages in which both proteins and fats are brought down to a similar condition, final common paths in metabolism; for the amino-acids deprived of their amino groups are already lower fatty acids; from these the formation of sugar is equally conceivable whether they are derived from fats or proteins.

The remarks on the phospholipines are of much interest. These bodies are hardly less universally distributed where the phenomena of life are to be observed than the proteins themselves. Indeed, some are inclined to think of protoplasm as an emulsion of proteins and "lipoids."

We can strongly recommend the book to all who are interested in this fascinating chapter of physiology and of chemistry. Like everything from Professor Leathes's pen, it is terse, accurate, and eminently judicial.

ORGANIC CHEMISTRY.

Mr. F. G. Pope's *Modern Research in Organic Chemistry*[3] deals with a very interesting subject, the complexity and extent of which makes it not very readily accessible to those not actually engaged in some branch of it. The enormous growth of organic chemistry in recent years is a commonplace, and one necessary consequence of its development is the introduction, or rather the evolution, of nomenclature and symbols which make it very difficult for any one whose study of the subject is a few years old even to follow a modern paper. To take an example at random from the book before us, we find that the systematic name of carvone is "Δ 6, 8, (9) menthadiene-one-2," while some of the structural formulae are things to marvel at. The author gives a concise account of the results of researches in the last few years in the following groups: The polymethylenes, the terpenes and camphors, the purine group, the alkaloids, the pyrones, and ketens, ozonides, and triphenylmethyl; while other chapters are devoted to the relation between colour and constitution, salt formation, pseudo-acids and bases, and the Grignard reaction. It is not very apparent what class of readers are especially in view, since a not inconsiderable amount of special knowledge seems to be assumed, and is necessary for following the text, while any one specializing in any of the matters dealt with would naturally study the original papers and go into them more fully than is possible in a summary such as the present. Probably the organic chemist desiring a succinct account of modern work in some other section than his own special one will find it very useful. With so much interesting matter in the book, it is not easy to choose any for special reference, but probably the chapter on alkaloids will be as interesting as any from the point of view of medicine. Twenty members of this group are dealt with; their constitution is stated and the steps by which it has been established related, the final proof in many cases having been given by preparing synthetically an alkaloid identical in all respects with the natural substance; those described include morphine, atropine, cocaine, hydrastine, and others used in medicine. The book is not quite free from minor errors; unfortunately, in the first formula which is given, for the purpose of illustrating the nomenclature used to locate double bonds, the double bond is put in the wrong place and one hydrogen atom too many is shown; and thus the explanation becomes only a mystification. On the same page is a reference to "ethylene, which forms the weakest ring," whereas ethylene is not a ring compound, and to Baeyer's "Spannung's Theorie," as though Spannung were the name of the originator, instead of "Spannungstheorie" (tension theory).

[3] *Modern Research in Organic Chemistry.* By F. G. Pope, B.Sc.Lond., F.C.S. With 261 diagrams. London: Methuen and Co., Ltd. 1912. (Crown 8vo, pp. 346. 7s. 6d.)

The large number of textbooks on organic chemistry is apt to be somewhat bewildering to an intending student, and their number is being constantly increased by a tendency on the part of teachers to provide books following the particular arrangement which they have found suitable, instead of utilizing those already existing; probably, however, the multiplicity of textbooks is, on the whole, a gain. *A Second Year Course of Organic Chemistry for Technical Institutes,*[4] by Mr. F. B. Thole, is one of the latest. As its title states, it is intended primarily for use in technical colleges, in one of which the author is lecturer in this subject. The greater part of the book is devoted to the aromatic series of compounds, but some of the aliphatic series appear in the tables in the appendix. The matter is presented in a condensed form, somewhat in the style of notes on a course of lectures. As an accessory to such a course, the book will doubtless prove useful.

Practical organic chemistry is a subject in which the medical student is apt to receive too little instruction rather than too much. It is of service to the medical practitioner in many ways besides the obvious one of enabling him to recognize abnormal organic bodies in the urine of his patients. Dr. Haas has provided a small book[5] on the subject, adapted more especially to the needs of medical students, and covering rather more than the ground of the syllabus of the practical examination in organic and applied chemistry of the University of London. He also expounds the theoretical principles underlying certain of the exercises, giving physical as well as chemical explanations of the tests and methods employed wherever necessary. First he goes through the various methods of preparation employed, then the chief means of quantitative organic analysis that would be used by the medical man, then the chief qualitative tests. An appendix contains a few useful pages on the properties of colloids, mass-action, and on other matters for which no place has been found in the text. Dr. Haas writes as a man who is primarily a physicist and chemist rather than one who has to deal with the problems of organic chemistry as they occur in practical medicine. For example, in discussing glycosuria he gives excellent accounts of the qualitative and quantitative estimations of glucose in the urine, but leave untouched the very important question that so often arises in medical practice, Does a given specimen of urine that reduces Fehling's solution contain glucose, glycuronic acid, galactose, or some other reducing substance? In the same way he gives the various tests used for the detection of acetone and of aceto-acetic acid in the urine, but does not mention the no less important beta-oxybutyric acid. Such pathological details as he does insert are not always indisputable; on p. 68 we read, "The increased output of oxalic acid which is produced in diabetes gives rise to the condition known as oxaluria." Photomicrographs of the ozazones of glucose, lactose, and maltose are given, and the use of the polarimeter is carefully explained. The book may be recommended to medical students working at practical organic chemistry.

[4] *A Second Year Course of Organic Chemistry for Technical Institutes.* The Carbocyclic Compounds. By F. B. Thole, B.Sc.Lond. London: Methuen and Co., Ltd. 1912. (Cr. 8vo, pp. 186. 2s. 6d.)

[5] *Laboratory Notes on Organic Chemistry for Medical Students.* By Paul Haas, D.Sc., Ph.D. London: Macmillan and Co. 1910. (Pp. viii + 128, with 3 plates and 20 figures in the text. Price 2s. 6d.)

TREATMENT OF SYPHILIS.

Dr. Leredde is well known as an advocate of intensive methods in the treatment of syphilis. In his most recent work, *La stérilization de la syphilis,*[6] he discusses the question of sterilization by salvarsan, by mercury, and by both drugs combined. He says that it is proved that the frequency of sterilization depends on the remedy used and the manner in which it is used. We should say that it depends more on the quality and quantity of the virus, and still more on the power of resistance of the patient.

[6] *La stérilization de la syphilis.* Par le Dr. Leredde. Paris: A. Maloine. 1912. (Post 8vo, pp. 149; plates 3. Fr. 2.50.)

As regards the accidents following salvarsan, he rightly attributes many of them to faulty technique and to neglect of contraindications, but when he attempts to explain the so-called "neuro-recurrences" we cannot altogether accept his views. He says that these are of two kinds: (1) An inflammatory reaction, analogous to Herxheimer's reaction, affecting the meninges, occurring soon after injection of salvarsan; (2) later phenomena, syphilitic and non-toxic in nature, due to insufficient doses of salvarsan. He considers that the non-toxic nature of these "neuro-recurrences" is proved by their improvement under further treatment by salvarsan. This is not in accordance with the experience of Finger and Gaucher, who have reported cases which were not improved by further treatment. Leredde states that identical symptoms occur in cases treated with mercury, and in non-treated cases, and are due to meningitis. He attributes their greater frequency after salvarsan to localization of the meningitis. This is not convincing: it would seem more probable that the effects are toxic. Leredde, however, admits that salvarsan is toxic when elimination is deficient, and that it is dangerous when there is extensive disease of the heart and vessels, kidneys or nervous system. As evidence of sterilization, produced by the methods he describes, Leredde places chief reliance on the Wassermann reaction, which he regards as of immense diagnostic and therapeutic value, since it allows comparison between all the methods of treatment of syphilis, and control of the results. We would refer the author to the remarks made by Sir Henry Morris at the conclusion of the recent discussion on syphilis at the Royal Society of Medicine (*Proc. Royal Soc. Med.*, October, 1912), and would add that if the Wassermann reaction is, as many observers suggest, to be regarded only as a symptom of syphilis, there is no logical reason why the absence of this symptom should be regarded as a criterion of the cure of syphilis, any more than the absence of any other symptom of the disease.

In his monograph on treatment by salvarsan,[7] Dr. GENNERICH describes the treatment of syphilis by salvarsan, by neo-salvarsan, and by combined treatment with mercury. He considers neo-salvarsan inferior to the old salvarsan; the clinical signs are similar, but the effect on the serum reaction is less marked; however, he thinks neo-salvarsan useful in some cases, and for final injections after a course of salvarsan, because, owing to its neutral reaction, it does not cause the anaphylactic phenomena resulting in cyanosis, etc., which sometimes follow salvarsan. He does not regard this cyanosis as due to toxic action, but to chemical reaction or constitution. This seems rather a fine distinction. Dr. Gennerich recommends moderate doses of salvarsan—0.5 gram in men, 0.4 in women, 0.1 in children, and 0.02 to 0.05 in sucklings. He regards 0.6 gram as the maximum dose in adults. He holds Wechselmann's view that many of the accidents after salvarsan, especially instances of rigor, fever, nausea, diarrhoea, and, in severe cases, loss of consciousness, convulsions, and coma, are due to the presence of microbes in the saline solution, or distilled water used for injection, and believes that these set up acute haemorrhagic encephalitis. An intensive course of salvarsan, according to Gennerich, consists of eight intravenous injections—a total of 4 grams of the drug (maximum). For combined treatment with mercury he prefers calomel injections. Dr. Gennerich is an enthusiast with regard to abortive treatment, and considers that in cases of primary syphilis with negative Wassermann reaction, three or four injections of salvarsan and mercurial treatment for four or five weeks are sufficient for a cure, the serum reaction being tested at intervals afterwards. We must confess that we cannot share Dr. Gennerich's optimism, and should like to see patients thus treated in five or ten years' time.

[7] *Die Praxis der Salvarsanbehandlung.* Von Dr. Gennerich. Berlin: August Hirschwald. 1912. (Roy. 8vo, pp. 97. Tfln. 2. Price, M. 3.60.)

NOTES ON BOOKS.

THE first number of the *Tropical Diseases Bulletin* (price 1s. 6d.), issued under the direction of the honorary managing committee of the Tropical Diseases Bureau, has been issued. It is edited by the Director, Dr. A. G. BAGSHAWE, and consists of abstracts of recent papers arranged under the heads of kala-azar, malaria, blackwater fever, relapsing fever, and sleeping sickness. The bureau has also issued the *Tropical Veterinary Bulletin* (price 3s.), which is edited by Mr. A. LESLIE SHEATHER, B.Sc., M.R.C.V.S. It also consists of abstracts under the headings piroplasmosis, anaplasmosis, trypanosomiasis, and "miscellaneous." Among the diseases included under the last heading are Leishmaniasis, osteomalacia, and foot and mouth disease. The fasciculus also contains a bibliography of recent literature. The last number of the *Sleeping Sickness Bulletin* (vol. iv, No. 40) was issued in the autumn, and an index and title page will appear shortly. In future the account of the current literature on trypanosome disease which appeared in this bulletin will be embodied in the *Tropical Diseases Bulletin*, but it will be somewhat less detailed than formerly.

Dr. CHAPPLE has written a small volume on *First Principles in the Art of Physical Development*,[8] in which he upholds swimming as the most perfect type of exercise for development of the body, and urges the national importance of adequate provision of public swimming baths. The pulmonary ventilation is greater in swimming than in mountain climbing, and no exercise does more to open out the lungs and ensure their thorough expansion. The effect of cold baths on the skin and through the cutaneous nerves on the nervous system is of the utmost importance: there is much more in a bath than its mere cleansing property. The author writes in a clear and convincing style, and if his suggestions were generally adopted the nation would be far healthier.

The collected papers of the late Dr. CHRISTIAN FENGER of Chicago[9] cover nearly every branch of surgery, and number some 200. Their appearance in book form is due to the formation shortly after Dr. Fenger's death of a Fenger Memorial Association, which, among other things, established a fund for the promotion of medical investigation. The late Dr. Fenger, born in 1840, and a Dane by birth, commenced his medical career during the Danish war of 1864, and after serving with an ambulance in the Franco-German war of 1870, held for some years a post in the sanitary department of the Egyptian Government. In 1877 he went to the United States; he possessed neither money nor influence, but his abilities were quickly recognized. Commencing as a teacher of surgery and surgical pathology, he became Professor of Surgery at the College of Physicians and Surgeons of Chicago within six years, and subsequently held the corresponding appointment at the Rush Medical College. In 1900, on the occasion of his sixtieth birthday, he was the guest of some 500 Chicago medical men and old pupils, and was presented with his portrait. In the following year he was president both of the Chicago Medical and the Chicago Surgical Society, and in 1902 he died. The general character of the papers in the two volumes and some autobiographic notes make his personal popularity and his high professional repute quite comprehensible.

At its meeting in London last year, under the presidency of Mr. Hurry Fenwick, the International Association of Urology discussed only three questions—phosphaturia and oxaluria, the remote results of prostatectomy, and extensive resections of the bladder. Hence the portliness of the volume of *Transactions*,[10] which has been ably edited by Mr. JOHN PARDOE, the general secretary of this second congress, is due less to the number of discussions than to the colossal length of some of the papers contributed. It is scarcely remarkable, indeed, that little or nothing in the way of a real discussion seems to have succeeded the reading of any of them. Several of the principal papers are by English and American authors, and of all the more formal contributions abstracts are supplied in four languages.

The *Index to Practical Nursing*,[11] by Dr. BASIL COOK, Senior Medical Officer of Kensington Infirmary, is a kind of encyclopaedia relating to the various procedures employed in practical nursing, and includes a useful paragraph headed "Don'ts." Throughout the volume the

[8] *First Principles in the Art of Physical Development.* By W. A. Chapple, M.P., M.D., Ch.B., M.R.C.S., D.P.H. London: Cassell and Co., Ltd. 1910. (Cr. 8vo, pp. 87, with illustrations. 1s.)

[9] *The Collected Works of Charles Fenger, M.D.* 1840–1902. Philadelphia and London: W. B. Saunders Company, 1912. (Royal 8vo, pp. 1057; illustrated. Price £3 10s. net.)

[10] *Deuxième Congrès de l'Association Internationale d'Urologie.* Londres le 24–28 Juillet 1911. Procès verbaux, rapports et discussions. Edited by J. G. Pardoe, F.R.C.S. London: Adlard and Son; Paris: Masson et Cie. 1912. (Cr. 8vo, pp. 735. Price 10s. net.)

[11] *Index to Practical Nursing.* By J. Basil Cook, M.D., D.P.H. London: Baillière, Tindall, and Cox. 1912. (Double fcap. 16mo., pp. 174. Price 2s. net.)

directions given are so clear and concise that the book should be of much utility to probationer nurses, and might also be very useful to those who have to give lectures to them as a source of texts on which to dilate.

The publications of the Association of Standardized Knowledge now include, among others, *The Strategy of Nature, Axioms and Principles of the Science of Organization, Needs and Ideals*, and *Standardization in Education*.[12] They are part of a series now being published under the general title of the Synthetic Series, all being so written as to explain and illustrate the science of organization, as formulated by Mr. Marshall Bruce-Williams. It is claimed that this science is essentially practical and has immediate reference to most of the problems of the day. It rests on the axiom that all society is an extension of the individual, and includes three principles named duality, degree, and the line of least resistance. The essential difference between this and similar attempts to find formulae for the absolute in Nature is stated to be that Mr. Bruce-Williams has provided his science with a theoretic unit—an imaginary individual exceeding all actual individuals in every respect and measuring 100 in every sense, function, and faculty. The president of the organization is Mr. Bruce-Williams himself, most of the vice-presidents being army officers, including several officers of the Royal Engineers. Certain charts used in the pamphlet on *Standardization in Education* are stated to be applicable to all educational work, and enable it to be seen at a glance what progress, if any, is being made. The War Office appears to be making use of some of them.

The official report of the *Proceedings of the National Conference on the Prevention of Destitution*[13] last summer constitutes a useful record of current thought on a subject having many relations with the problems of everyday medical life. Many of the speakers were medical men, and the president of the public health section was Sir Francis Champneys. The other sections which shared the general work of the conference were entitled Education, Housing, Unemployment, Crime, and Inebriety. Most of the sections seem to have held eight sessions, and the proceedings occupy a royal octavo volume of nearly 800 pages, which, being very closely printed and naturally devoid of illustrations, present a somewhat formidable appearance.

A copy of *Low's Handbook to the Charities of London*,[14] which has reached us, is the seventy-seventh annual edition of this useful reference book. It is the senior publication dealing with the subject, and making its appearance in the third quarter of each year, contains accounts of changes which have taken place subsequent to the issue of other like books. The charities are placed in alphabetical order, and all those seem to be included which have their head quarters in London, wherever the actual work may be carried out.

Diaries.

The rapidly approaching demise of the year 1912 is borne in upon one by the receipt of a number of samples of a fresh issue of the original *Letts's Diaries*, which for some years have been published solely by Messrs. Cassell and Co. They are of all shapes and sizes, varying not only in the amount of space that they provide for daily entries, but also in regard to the general information they supply. The latter is in many cases carefully specialized, to meet the needs of those who pursue various occupations. How wide is the ground thus covered will be sufficiently indicated by mentioning that the specimens before us range between diaries for social and general business purposes and volumes for printers, nurses, and doctors. The binding in all cases is strong, and in some elegant. A further point not without importance is that each includes an insurance coupon of a comprehensive character. The diary for nurses includes plenty of space for recording details regarding the progress of cases, while that for doctors contains a well-arranged visiting list.

[12] *The Strategy of Nature.* (Crown 8vo, pp. 60. 2s. 6d. net.) *Needs and Ideals.* (Crown 8vo, pp. 14. 3d.) *Standardization in Education.* (Crown 8vo, pp. 14. 3d.) *Axioms and Principles of the Science of Organization.* (Royal 8vo, with many coloured charts and diagrams, pp. 21. 7s 6d.) London: The Association of Standardized Knowledge, 15-16, Buckingham Street, Adelphi, W.C. 1912.

[13] *Proceedings of the National Conference on the Prevention of Destitution.* London: P. S. King and Son. 1912. (Roy. 8vo, pp. 793. Price 10s. 6d. net.)

[14] *Low's Handbook to the Charities of London.* Seventy-seventh year of publication. London: Charles H. Sell. 1912. (Post 8vo, pp. 250. Price 1s.)

THE CYCLE CAR SHOW.

FROM THE MEDICAL MAN'S POINT OF VIEW.

By H. Massac Buist.

There is no gainsaying that from the medical man's point of view the Cycle Car Show at Olympia, Kensington, which closes on Saturday evening, is a development of very considerable interest. To him it matters not that the Auto-Cycle Union's technical committee are floundering in vain endeavours to define what manner of machine a cycle car is, because he will deal only with those vehicles with a maximum engine volume of 67.1 cubic inches and a chassis weight not exceeding 6 cwt., and will not accept the Auto-Cycle Union's temporary definition by entertaining the idea of any three-wheeled vehicles, which he will regard as being motor tricycles, just as the Treasury does. Instead, the medical man has a present and, more particularly, a future use for what shall be evolved under the name of the cycle car with four wheels, and what shall therefore come under the two-guinea Treasury tax because that department regards any four-wheeled machine as being a car.

Indeed, if we are to be guided by what is staged at Olympia to-day, it is the addition of the fourth wheel alone that need be borrowed to justify the use of the word "car" in the style of this new hybrid vehicle. In the case of the bulk of the material presented for consideration, candour compels one to say that the medical man has no use for it yet. The reason is the very obvious one that too many of these vehicles have been hastily designed and produced at the last moment; in consequence, at least 80 per cent. of them have not been tested to anything like a sufficient extent. Further, inasmuch as reliability is one of the essentials for the medical man's service, and inasmuch as no fresh development can be proved reliable until it has had twelve months' service in the hands of the public—because things occur in these circumstances which never arise when the most conscientious and skilled tester is even deliberately abusing a machine to prove its power of resistance—it follows that the cycle car, as a general proposition, will have a vastly greater interest for him a year hence than it can have to-day.

Two Schools of Construction Contrasted.

There are, however, exceptional cases. Take that of the Swift concern, whose cycle car can scarcely be called an experiment, since it departs in so little from its already lengthy experience in small car construction. This machine, which is marketed complete for £125, follows car practice in that the vertical, water-cooled motor is a block casting, the three-speed gearbox is a self-complete unit, the suspension fore and aft is by semi-elliptic springs, the steering pillar is conventional, and the body gives two seats with high doors, the driver's being a little in advance of his companion's, which is recessed, on a principle employed in some of the early *coupe de l'auto* races for light cars, to give the maximum seating accommodation for a minimum car width. But in the matter of the frame, which is of the tubular sort, and the wheels, which are of the wire variety, and in sundry other details, cycle practice is introduced to bring the weight down to the limit of 6 cwt. prescribed for cycle-car chassis. The motor, too, instead of having four cylinders, for which there is alone a market in the car world, is a two-cylinder type of 75 mm. bore by 110 mm. stroke, so that the machine is of 7-h.p., according to Royal Automobile Club rating; actually, it gives considerably more power.

This firm, therefore, departs so little from its previous small car practice, and has, moreover, tested this vehicle to such an extent, that it is prepared to place as many of these machines in the hands of the public as it can produce this year, in contradistinction, for example, to the Rudge-Whitworth policy, which goes along the lines that, beyond having a fourth wheel, a cycle car must embody nothing whatever of motor car practice, but must be, instead, a machine built wholly on motor cycle lines, and, therefore, one which can be looked after by any motor cyclist, hence in the Rudge production there is no change speed gearbox controlled on the gate principle. There is neither chain nor propeller shaft drive, neither bevel nor worm back axle mechanism, nor differential gear. Instead, three belts are employed, also an air-cooled motor with a single cylinder of only 50 per cent. more capacity than the

standard 3½-h.p. Rudge motor bicycle engine. Yet, by reason of the complete vehicle scaling with body considerably less than the weight limit set for a cycle car chassis alone, this one-cylinder suffices to propel the machine easily at a speed of forty-five miles an hour, and it can be accelerated up to nearly a mile a minute.

It will be seen, however, that, in place of being a vehicle of familiar appearance, this is something fresh to our ken, and therefore necessarily largely experimental. The suspension is extraordinarily low, and, as staged at Olympia, the exhaust pipe has a clearance of scarcely more than 2 in. at one point, but such details as that are to be modified in machines subsequently to be produced. A point to note *à propos* of the Rudge is that these new-style vehicles, with their relatively fast speed powers and extraordinarily light weight, will certainly experience, among other difficulties yet to be overcome, trouble in the matter of holding the road. Hence it is interesting to study the extraordinarily low centre of gravity combined with the proportionately broad track of the Rudge. Most of the cycle cars staged at Olympia are far too narrow in the track, and the centre of gravity is proportionately much higher than in the motor car proper of to-day.

Fuel Consumption not yet Studied.

When pondering the question of the cycle car at a period when the price of petrol has reached the abnormal figure of 1s. 8d. a gallon, the first thing the medical man of moderate means would assume is that not only his tyre but also his fuel costs in the case of a vehicle weighing a quarter or at most a third of that of the ordinary motor car would be proportionately less. These are the times when we can get cars weighing 27 hundredweight unladen, to travel with two passengers twenty miles to the gallon as a matter of course, save in hilly districts. Judge, then, one's natural surprise at discovering by process of tedious and exhaustive cross-examination that there are mighty few of these cycle cars which will do more than thirty miles to the gallon. That reveals incidentally how little time there has yet been to study the scientific problems of the cycle car, for obviously machines of this weight must, within a year or two, be doing easily forty to fifty miles on a gallon, and there is no reason whatever why they should not be doing eighty miles to the gallon as a matter of course in the hands of the average user four years from now.

Apparently some of the best results in the matter of petrol consumption are to be got with the types of cycle cars that are such in name alone, as, for example, the Singer machine, which can be described only as a car in miniature. This is what might be called a *de luxe* pattern in cycle cars, for it is sold complete with hood, screen, spare wheel and tyre, lamp sets, horn, tools and so forth for £185, the motor being a four-cylinder block casting water-cooled, with 63 mm. bore by 88 mm. piston travel, while the drive is from the clutch by propeller shaft to a three-speed gearbox, which is combined with the bevel and differential mechanism in the back axle. Here is a type, therefore, which has certainly an appeal to the medical man, but which, equally certainly, is no mechanical novelty. It is, instead, a motor car produced on the most up-to-date lines but on a scale so light as to come within the cycle car chassis weight definition, and therefore, with a small engine of a refined and balanced character and relatively wide range of revolutions, to give rates of travel at more than double the legal limit. As shown with covered two seats, coupé style coachwork, it looks quite a dainty car for doctors' use.

Humbers, on the other hand, incorporate much of cycle practice in their cycle car. It is marketed complete with hood, screen, horn, head and tail lamps at £125, which would appear to be about the average price of these vehicles. Nor does one see any immediate necessity for their being brought down to the sum of £100, which in the lay mind appears to constitute the main definition of a cycle car. In face of the fact that we are striving to evolve a wholly fresh type of machine, it were surely better that we should seek first to overcome all the mechanical difficulties, for then the market will be so large that, on the mere principle of reproduction work, costs can be brought down to an extraordinary extent. The Humber car follows the Singer in that the gearbox is combined with the back axle, but for all its outward appearance suggesting the lines of a motor car, the Humber is distinctly the embodiment of cycle practice, including the tubular frame, the wire wheels, and the employment of an air-cooled, V-set, two-cylinder motor of 84 mm. bore measured by 90 mm. piston travel. A half elliptical transverse spring is used for the front suspension, while two quarter-elliptical springs are employed behind. The bonnet is of the sloping sort merging into the scuttle dash, and there are high side doors to the seats, which are well forward of the back axle, the whole machine having a neat appearance.

Machines mostly Under-tyred.

When one has in mind the fact that many of the forms of power transmission are somewhat on the crude side, and also that most of the vehicles are capable of a goodly turn of speed, there can be no gainsaying that the majority of them are under-tyred. The suspension is also obviously more suitable to a motor cyclist's habits of road travel than to those of persons accustomed to going about by car or carriage. Thus from the medical man's point of view a round dozen of machines may be dismissed from consideration by reason of their having friction drive, crude suspension, or what not.

But mention may be made of such types as the Chater-Lea machine, supplied complete with body and two-cylinder water-cooled motor at 135 guineas. This vehicle has channel section, pressed steel frame, inswept forward to afford wide steering lock, self-contained gearbox, and overhead worm drive in back axle. There is also the Acton-built Wilkinson 7-h.p. cycle car with 4-cylinder water-cooled motor, the gearbox giving three speeds forward with a direct drive on the top, also a reverse, and the live axle has a bevel drive and differential gear.

The makers of the Bowden brake are among those resolved to enter into this new industry, in consequence of which they bring forward the Tyseley car, named after the district in Warwickshire in which their factory is established. Though a two-cylinder V-set engine is employed for this, it is a water-cooled one. The machine has a distinct appearance by reason of the employment of a channel section pressed steel frame dipped pronouncedly between the two axles to afford low entrance, while the rear suspension is by three-quarter elliptical springs, and the back axle is equipped with bevel and differential gear, the whole car weighing under 8 cwt. It is not designed for speed work, but rather to be suitable for refined service at between twenty-five and thirty miles an hour, the price being 160 guineas, including spare wheel and tyre, hood, screen, lamps, horn, and tool kit, while for the medical man it is furnished complete at 185 guineas with coupé body.

The 8-h.p. Arden cycle car, marketed at 117 guineas with hood and screen, has a gearbox giving three speeds and a reverse, with the direct drive on the top, together with bevel-driven back axle and differential gear. It is, perhaps, out of the ordinary in having three-quarter elliptic front springs and a frame fashioned of oak, reinforced by steel flitch plates and suitably stiffened by cross members. A twin-cylinder 8-h.p. engine is employed.

The Alldays' "Midget" light car is sold complete for £130, the equipment including an 8-h.p. twin-cylinder water-cooled motor and power transmission through a leather-to-metal cone clutch to a three-speed and reverse gearbox, and so by cardan shaft to a worm-driven back axle.

THE late Dr. Edward Woakes left estate of the gross value of £31,157, of which £25,874 is net personalty.

MR. J. B. BRADY, of New York, has given £40,000 to the trustees of the Johns Hopkins Hospital, Baltimore, to be used in founding the James Buchanan Brady Urological Institute as a separate unit of the hospital. In addition (says the *Medical Record*) Mr. Brady will during his life pay £3,000 a year for the maintenance of the institute, and will make ample provision in his will for its continuance. The trustees intend to erect a six-story building with special laboratories for research and accommodation for both public and private patients. The benefaction is an expression of Mr. Brady's interest in the Johns Hopkins Hospital arising from his recent stay there as a patient.

ALCOHOL AND MORTALITY.

THE estimates of the number of deaths attributable wholly or in part to the abuse of intoxicants which have been published by various authorities differ extremely one from another. A little consideration makes it plain that many of these estimates rest upon dubious foundations, so that there is ample room for a thorough investigation of the problem. Mr. E. B. Phelps, the editor of a leading American insurance journal, has attempted to provide such an investigation.[1]

Mr. Phelps proceeded in the following way: A list of the 187 causes and classes of death scheduled by the United States census authorities was submitted to an insurance physician, and he was requested to select those classes in the case of which any male death between the ages of 20 and 74 inclusive could, in his judgement, have been due wholly or in part to the use of alcohol. From this list the physician selected 106 causes of death in which he thought alcohol might be a contributory factor. This selected list was then submitted to three leading insurance medical officers independently, and each was asked to state the percentages of deaths under the various headings in which alcohol might be deemed to have played a part. The means of the three percentages were then ascertained, and the total deaths from each cause multiplied by the mean percentage. Each product was taken to be the contribution of the corresponding disease to the sum of deaths attributable to alcoholism. For instance—one physician estimated that 80 per cent. of the deaths from cirrhosis of the liver were connected with alcohol, the other two put the percentage at 90 and 30 respectively. The mean of the three is about 67. In the registration area of the United States, 4,123 deaths attributed to cirrhosis of the liver occurred in 1908. By multiplying this by 0.67 the figure 2,762 is obtained as the number attributable directly or indirectly to alcoholic habits. Having obtained a figure for males (between 20 and 74) by this process, Mr. Phelps assumed, after discussion with various authorities, that the alcoholic mortality among females was about a fifth of the male rate, and on this hypothesis arrived at the total number of deaths for both sexes in the registration area. He then, with the help of various conjectures all described in detail, extended these results to the population outside the registration area, and finally concludes that the mortality of alcohol is about 5.1 per cent. of the mortality at all ages, or 7.7 per cent. of the total mortality at adult ages, and that about 66,000 deaths in the United States in 1908 were connected with alcoholism.

We frankly admit that an investigation of this sort, in which all the assumptions involved are fairly described and available for criticism, is superior to the random guesses of partisans. We also recognize that the engaging simplicity of the method will have an attraction for those—and they are many—who are repelled by the elaborate technical details of actuarial work. Having made these concessions, however, we must state with equal frankness that Mr. Phelps's inquiry seems to us open to the gravest possible objections.

The reader will already have noticed, from the figures relating to cirrhosis of the liver given above, that the estimates of the medical experts differed enormously one from another, and it may be advisable to give a few more examples. In 1908, 33,900 males between 20 and 74 died of pulmonary tuberculosis; one expert puts the alcoholic contribution to the total at 2 per cent., a second at 25 per cent., the third at 8 per cent. "Heart disease" is another large cause of mortality; here the estimates were 10, 30 and 8 per cent.

Mr. Phelps actually seems to regard these wide divergencies of view with satisfaction, and remarks: "As a rule there is a vast amount of difference in the reliability of averages respectively based on 3 and 300 sets of observations; but when it so happens that there are extreme differences, in the former case the averages of these extremes are very apt to take the form of exceedingly broad averages." To submit this passage to technical statistical criticism would be breaking a butterfly upon the wheel, but we may be permitted to wonder how it is that an obvious interpretation of the divergencies did not occur to Mr. Phelps. Surely it is probable that in answering so vague a question as that proposed to the medical experts, the personal equation enters so largely into the matter that the conclusion of one observer is not comparable with that of another. Each man attaches a different meaning to such a phrase as "Male deaths . . . in the case of which alcohol may have been an important contributory factor, and sometimes the principal causative factor." In other words, we do not believe that different estimates can fairly be regarded as forming members of a homogeneous series the average of which has an intelligible meaning.

If our view be correct, it is needless to turn to criticisms of detail, but we may stay to remark that Mr. Phelps does not appear to use his own method consistently throughout. Thus, he wishes to compare the urban and rural mortality from alcohol. Being presumably (we are not familiar with the American official returns) unable to apply his process to the two types of district separately, he accepts Dr. Stevenson's view that the combined mortality from alcoholism and cirrhosis of the liver is a better indication of alcoholism than the deaths attributed to the latter alone, and assumes that the alcoholic mortalities in urban and rural districts are in the same ratio as the total deaths from the above-mentioned causes in the respective areas. We should have thought he would have multiplied each cause of death by the average percentage factor obtained from his experts' estimates before forming the ratio. This, however, is, as we have said, a detail. It seems to us that no solid contribution to the subject will be possible until some stringent definitions of terms have been adopted, and the heated nature of the controversies which seem inevitably to arise when the subject of alcohol is mentioned will render any general agreement on fundamentals extremely difficult. Whether any result, however obtained, is likely to affect the general attitude towards the problem of alcoholic intemperance is a question which may in its turn give rise to discussion.

[1] *The Mortality of Alcohol: A Statistical Approximation of the Deaths in the United States in which Alcohol may Figure as a Causative or Contributory Factor.* By Edward Burnell Phelps, M.A., F.S.S. New York: Thrift Publishing Company. 1911. (Sup. roy. 8vo, pp. 81. Price 2 dollars.)

SCIENCE NOTES.

IN an extremely interesting little monograph on blood corpuscles and wandering cells,[1] Professor FRANZ WEIDENREICH, of Strassburg, thanks to a figurative and fluent style, turns what might well be a dull recital into a charming dissertation, full of suggestive ideas and livened by numerous illustrations. The secret, perhaps, of such a successful result lies in the fact that he has treated the matter from a broadly comparative point of view, and has endeavoured to demonstrate the why and the wherefore of the forms and functions of the various blood corpuscles by tracing their development, or rather by indicating their analogies, throughout the whole range of the animal world. At the outset he gives a general account of the cells found in the blood and lymph, especially remarking on their power of independent movement. He goes on to discuss the phylogenetic derivation of the vascular system according to Arnold Lang's theory—namely, that it arises by a splitting of the mesoderm between the primitive intestine and the coelom, and he fancies that the function of the blood as a carrier of absorbed material lends colour to this hypothesis. With regard to the colourless blood corpuscles, he takes exception to Ehrlich's system of classification according to the staining properties of their granules, and he maintains that the method is biologically unsound. These staining properties, he insists, give evidence only of simple chemical reactions and afford no indication of the morphological and genetic affinities of the cells in question. With regard to the nature and function of the granules, he has much that is interesting to say, and here, again, he is opposed to Ehrlich, who regards them as products of secretion. He points out that from experiment it seems not unlikely that the granules may contain reserve materials and that they may function in a variety of other ways. The mode and place of origin of the various forms of leucocytes have given rise to much discussion, and here, again, the author maintains that the generally accepted opinions are in need of modification and even of alteration in several important details.

[1] *Bluthörperchen und Wanderzellen.* Von Professor Dr. Franz Weidenreich. Jena: Gustav Fischer. 1911. (Roy. 8vo, pp. 65. Price M. 1.60.)

THE NEW INSTITUTE OF PHARMACOLOGY, UNIVERSITY COLLEGE, LONDON.

THE doctor has perhaps been too much identified with drugs in the past; now there is some danger lest disbelief in drugs should be carried too far. If our predecessors physicked too freely, that was due to their ignorance of the exact physiological and medicinal properties of the remedies they ordered on so generous a scale; and that ignorance led to the use of substances of the strangest and often most disgusting kind, which tradition mingled with superstition had credited with healing virtues. Till comparatively recent times pharmacology, like all other branches of medicine, was mainly empirical; and it is only during the last half century that it has been studied in the manner that alone can yield really fruitful results—that is, by the experimental method. Already that method has placed pharmacology on a really scientific basis.

Scientific Pharmacology.

One of the best expositions of the manner in which exact knowledge on the action of drugs has been and is being acquired is to be found in the evidence given by Professor A. R. Cushny before the Royal Commission on Vivisection. A summary of that evidence will serve to show the aims and methods of scientific pharmacology. Research is directed to the discovery of the manner of action of drugs in human beings when their mode of operation could not be seen by observation of their effects on animals either in health or in disease, particularly in health. The effects of purgatives are obvious, and therefore experiments on animals have added little to our knowledge of their action. But the effects of drugs which act on the brain, for instance, or the heart or the liver or the kidney, had necessarily to be worked out by experiments on animals. Taking digitalis as an example, he pointed out that digitalis was introduced into medicine about 1785 by Withering, who found that it was a remedy for dropsy; and it was used in that condition for a good many years, more or less at random, because its mode of action was not understood. Traube sought to discover how digitalis acted by experiments on animals because he could not do so in his patients. Lauder Brunton, too, sought in animals for the explanation of problems which he could not solve in the human subject. Dr. Cushny pointed out how the danger of trusting exclusively to clinical observation for therapeutic advance was exemplified by the same drug. Digitalis is undoubtedly of value in certain forms of pneumonia, whereas in others it is useless or harmful. The heart action, however, discovered by experimental methods, directed the clinician's attention to this phase of pneumonia in relation to digitalis, and the statistics of cases of pneumonia in which the heart is involved show that these are benefited by digitalis. Again, for a long time lead was used to stop bleeding from the lungs, the substance being given by the stomach, generally in the form of pills. The efficacy of the remedy was unquestioned by physicians until experiment showed that lead is absorbed only in small quantities and very slowly. This fact induced clinicians to make a more careful analysis of the cases in which they had been in the habit of using the remedy, with the result that it was found that it was not the lead but the opium given with it which was the efficient principle in stopping the bleeding.

These examples illustrate the usefulness of experimental research in enabling the physician to administer medicines with a precise knowledge of their action and to reject drugs that are proved to be worthless. Formerly the doctor could apply his remedies only on the general principle that their administration was followed by improvement in some cases which more or less closely resembled that he was dealing with; now that he has a much clearer view of the actual efficacy of drugs he prescribes with a definite purpose. Experimental inquiry has vastly increased the therapeutic resources of the medical practitioner. In the enormous output of new preparations from chemical laboratories there are many which prove useful in medicine. Dr. Cushny gives numerous examples of drugs—hypnotics, anaesthetics, antipyretics, cardiac tonics, vaso-dilators, diuretics, and so forth—with which the pharmacological laboratory has enriched practical medicine. All, however, must be carefully tested in animals before they are tried in man.

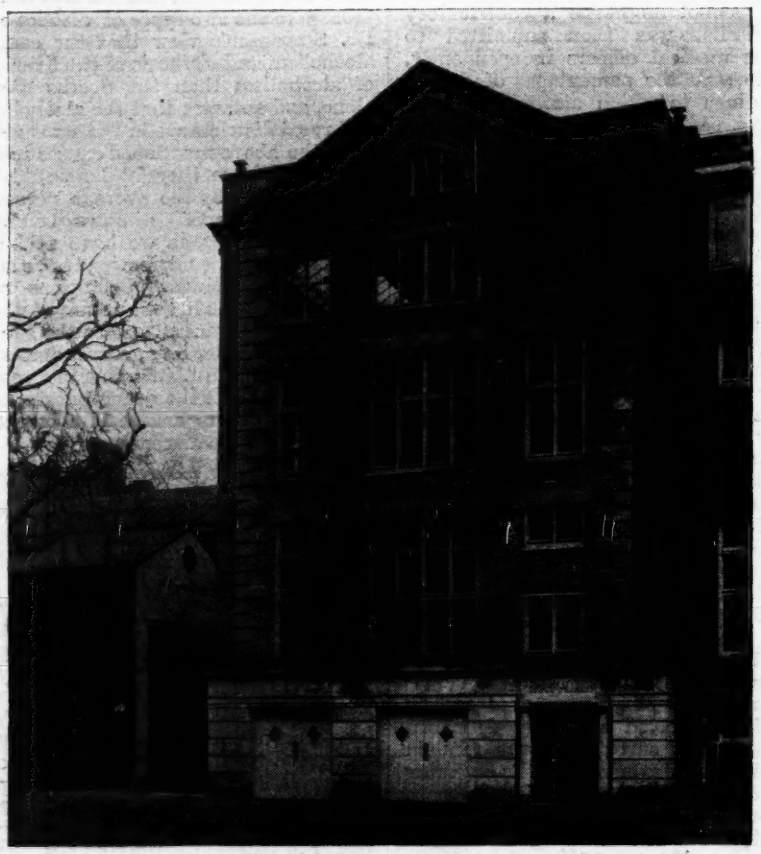
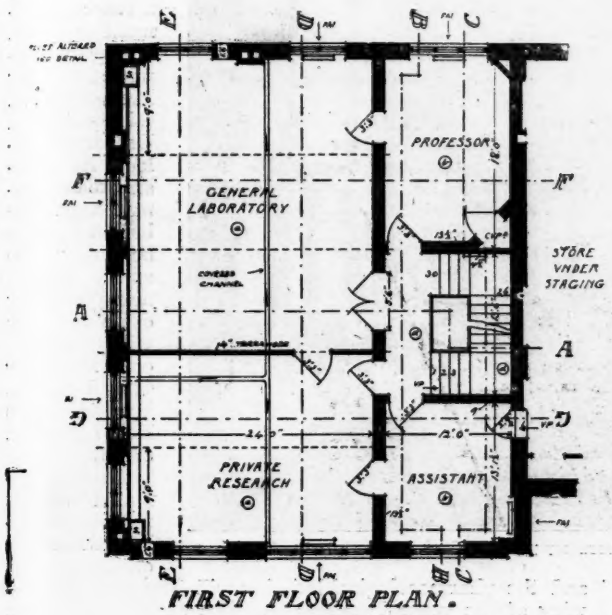


Fig. 1.—New Pharmacological Institute, University College.

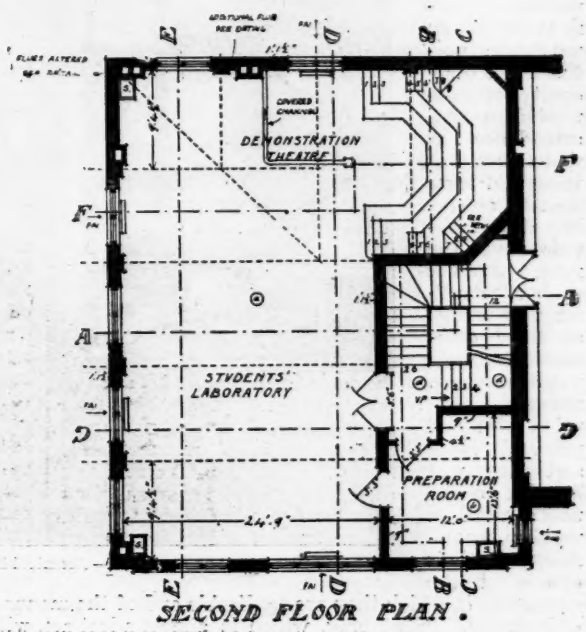
Standardization of Drugs.

One of the most important functions of scientific pharmacology is the standardization of drugs. Dr. Cushny gives some striking illustrations of the necessity of the experimental method for this purpose. He found that of two tinctures of digitalis supplied by a perfectly trustworthy firm, one was four times stronger than the other. It is plain that if a patient were treated with the weaker of these tinctures in the increasing doses necessary to obtain the thereapeutic effect, and the treatment were inadvertently continued with the stronger in the same dose, the results might easily be disastrous. In the case of ergot, the conditions were even worse, for a large quantity of this drug on the market was practically inert and the preparations were, therefore, valueless. A doctor might thus, in an emergency where the patient's life was at stake, depend on the action of a drug which had no effect. In regard to cannabis indica, Dr. Cushny stated that he had personal knowledge that 20,000 lb. of the drug were offered for sale to a firm which, before completing the transaction, had a sample tested on animals; finding it inactive they refused the consignment. The same firm informed him that since the introduction of physiological assay they had had practically no complaints whatever as to the inefficiency of products of cannabis indica, quite a contrast to their experience before that time. This points to a source of misleading observation which has led to much error in the past. It accounts for the notorious fact that a drug which proves

UNIVERSITY OF LONDON.
UNIVERSITY COLLEGE.
NEW PHARMACOLOGY LABORATORIES.



FIRST FLOOR PLAN.



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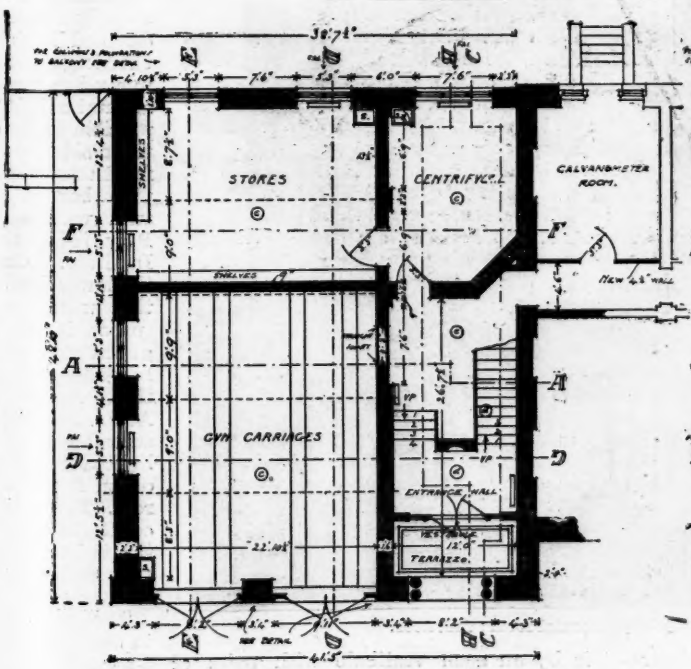

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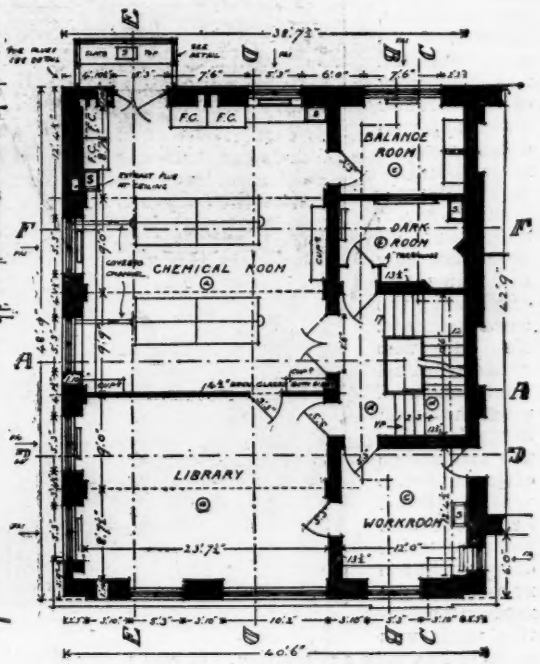
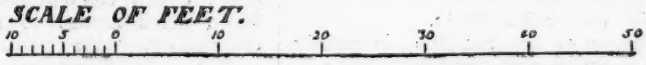


GROUND FLOOR PLAN.

SCALE OF FEET.



successful in the hands of one man is useless in those of another.

The New Pharmacology.

Enough has been said to show that if pharmacology is to be truly scientific it must be based on experimental research. It is obvious that doctors trained in a laboratory conducted on this principle will be incalculably better fitted for their life-work than the students of the older generation were with the perfunctory courses of practical pharmacy, attendance at which many of them did their best to escape. If the practitioners of the future have not such a miscellany of drugs at their command as their predecessors, those they have will be of proved value and they will be able to use them with a precise knowledge of their effects of the conditions in which they are applicable and of the manner of their use. Prescribing, which is almost a lost art, will become the application of a science.

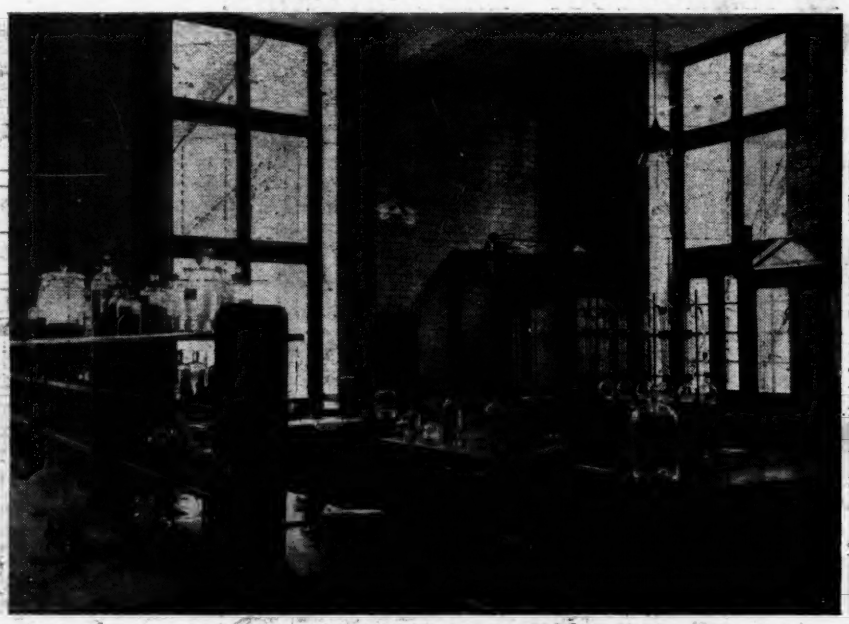


Fig. 2.—Chemical laboratory; ground floor.

To bring about this desirable state of things is the work of the pharmacological institute. In the JOURNAL of November 16th reference was made to the opening of such an institute at Oxford; now we have to announce the completion of a fine building to be devoted to the same purpose at University College, London. We are indebted to the courtesy of Professor Cushny, who conducted a representative of the BRITISH MEDICAL JOURNAL all over the new building and explained the arrangements. To one who remembered the teaching of pharmacy in the Seventies the appearance of the handsome well-lighted laboratories, equipped with every appliance required for modern scientific work, was nothing less than a revelation. It was a concrete illustration of the most convincing kind of the progress of medical science.

Fig. 3.—Large experimental room; first floor.

Description of the Buildings.

The following description of the buildings is mainly founded on notes kindly supplied by Professor Cushny:

The rearrangement of the University College departments on its incorporation in the University of London rendered increased provision necessary for the laboratories of anatomy, physiology, and pharmacology, and plans were made for building three institutes for these sciences in the south quadrangle. The first of these to be completed was the Physiological Institute, which was opened in 1909. An illustrated description of this was given in the BRITISH MEDICAL JOURNAL of June 12th, 1909. Last year a donation of £5,000 from Mr. Carnegie made a further instalment possible, and plans were prepared by Professor F. M. Simpson, of University College, for an institute of pharmacology. The building was begun in the spring and is now practically complete. It will be opened on December 4th by the President of the Royal College of Physicians.

The site selected adjoins the new Physiological Institute on the east side, and the pharmacological building will thus form the east wing of the general medical building, while the proposed anatomical institute will complete the south quadrangle.

The new laboratory measures 42 ft. by 50 ft., running north and south, and contains three complete floors and a mezzanine floor beside the basement, the actual floor spaces thus amounting to about 6,000 square feet besides stairway and passages.

Special attention has been directed to obtaining the maximum amount of light possible on the three sides, the fourth forming the boundary wall with the Physiological Institute. On the lower floors the window pace is the greatest allowed under the Building Acts, and the second story is lighted in addition from the roof. Throughout the building the lighting is thus entirely satisfactory.

The entrance to the building is by an open vestibule with pairs of Portland stone columns on either side. At night a pair of Bostwick gates closes the entrance. An oak screen with swing doors gives access to the staircase, which is of oak throughout, with panels of ironwork at the sides and a dado of grey-green terrazzo panels set in flush frames of white marble. The building is crowned by a pediment of Portland stone, and the quoins are also

of that material. The walling is light sand-faced Arlesey brick.

The ground floor is lined with white glazed brick throughout, and contains two rooms; one of these, 24 ft. by 18 ft., is used at present as a medical reading room, but it is intended to utilize it for pharmacological research when the anatomical institute is built and the medical library is provided for there. The other, 24 ft. by 30 ft., forms the chemical room of the institute, and will be used for advanced work in pharmacological chemistry. It is fitted up with two chemical benches and with fume cupboards, and, in addition, communicates with an open-air balcony on the south side, on which investigations with noxious fumes may be carried out. This floor also provides a workshop for the attendants, a balance room, and a small dark room for polariscope, etc.

Fig. 4.—Lecture room; laboratory (second floor) showing the demonstration recess.

The first floor is adapted for experimental research, and contains two small private rooms for the professor and assistant, and two large rooms, 24 by 18 ft. and 24 by 30 ft., for experimental research. The smaller of these is designed for work with the large kymograph, while the larger is to be used for smaller movable kymographs and other apparatus. One of the features of this floor is a wooden beam, 9 by 4 in., which stretches through both rooms at a height of 8½ ft. from the floor, and is rigidly supported in the walls and by iron straps from the roof girders. This carries a shaft with pulleys which are set in motion by an electric motor in the larger room, and which supply power for the large kymograph and for various other pieces of apparatus placed on tables near the beam. The beam carries also gas and water pipes with taps at intervals, from which the tables may be supplied. Wires run along it connected with an electric clock, so that time signals may be given at any point in either of the rooms. Lastly, the artificial respiration pump is connected with an iron pipe running along the beam with taps at five points, so that artificial respiration may be carried on in different parts of each room. Immediately below the beam a floor channel runs along the floor to carry off waste from water-driven apparatus. On each side of this, covered electric points are set in the floor, so that light and power are available throughout the laboratory. A long teak bench supported on cantilevers runs along the east wall beneath the windows in both rooms, and is supplied with water, gas, and electric power, and is used for smaller pieces of apparatus. All the ordinary pharmacological experiments are provided for on this floor. When special aseptic operations are requisite they will be performed in the adjoining aseptic rooms of the Physiological Institute.

A mezzanine floor is placed between the ground and first floor, and contains lavatories and store cupboards on one side, and a cement-floored room, 17 ft. by 12 ft., which is utilized for animals under special observation.

The second floor is lighted from three sides and also from the roof, and contains only two rooms—one a small preparation room, 13 by 14 ft., with the collection of drugs used in the lectures, etc.; the other, 48 by 25 ft. by 18 by 13 ft., is the combined lecture room, students' laboratory, and demonstration room. It is supplied with lecture table, with blackboards, water, gas and electric power, and projection lantern, and with tiers of experimental tables and seats which will serve for the practical work of the students. A new feature is the demonstration theatre, which forms a recess off the lecture room, and at which the more complicated experiments will be performed by the demonstrator. It measures 18 by 13 ft., and is furnished with three tiers of standing places, rising one above another, from which the spectators look down directly on the experimental table below. When a demonstration is given the students leave their usual seats in the body of the lecture-room laboratory and pass into this recess, from which they return to their usual places when the demonstration is finished. It is hoped in this way to

Fig. 5.—Kymograph room; first floor.

form a closer connexion between the demonstrations and the lecture and laboratory work than is possible when the demonstrations are given apart from these.

The basement of the building contains a large store-room and a room for heavy or noisy apparatus, such as large centrifuges. Room has also been found in it for the guns of the University Territorial Artillery Company. Animal houses lie at the back of the building, along with those of the physiological department.

Investigations in Progress.

Work has already been commenced in the laboratory, and investigations are being carried out on the relation of the thyroid secretion to various toxins, on the reaction of the heart to digitalis bodies, and on the action of drugs on the respiratory centre.

Formal Opening.

The institute will be formally opened by the President of the Royal College of Physicians on Wednesday, December 4th.

THE PARLIAMENTARY COMMITTEE ON PROPRIETARY MEDICINES.

AT the sitting of the Committee on November 21st the examination of Mr. C. H. Ratcliffe, joint managing director of Messrs. A. J. White, Limited, the proprietors of Mother Seigel's Curative Syrup, was continued.

Mr. Glyn Jones put the question of which he gave the witness notice at the previous sitting—whether he was prepared to deny any statement of fact made in *Secret Remedies* with regard to Seigel's Syrup.

The witness replied that, having carefully considered the question, he found that he could not deny any of the statements, though he held that their spirit and intention were misleading. The language used appeared to have been carefully guarded in order to avoid making any statement which could be regarded as libellous.

As regards claims made on behalf of the preparation, the witness said that no general claim was made unless it was supported by testimony obtained during a long period. The company had no testimonials from medical men, but about twenty doctors were amongst the shareholders. A number of testimonials had been received from educated persons.

Replying to Mr. Bathurst, the witness said he did not consider it a misleading statement to say, "This syrup will cure anaemia." He did not suggest that when there were eleven different vegetable extracts in a preparation, one extract attacked one complaint, and a second another.

The Chairman asked the witness whether, since he disclaimed any knowledge of the therapeutic action of the drugs which he stated to be contained in the preparation, he could produce as a witness any member or employee of the firm who had medical knowledge.

The Witness: The company is advised by a doctor, but for obvious reasons he cannot be brought forward.

The Chairman: I am afraid if you cannot produce him the Committee cannot attach very great weight to that statement.

Sir Philip Magnus: Can you suggest any medical man who would give evidence as to the medicinal properties of the preparation?—I am afraid I cannot.

The Chairman called the witness's attention to the following statement which appeared on the package of Seigel's Syrup:

> British Government stamp affixed to the cork inside. Guaranteed to be genuine.

He asked witness whether that statement would not mislead ignorant people into thinking that the Government stamp was a guarantee.

The witness replied that the statement was not there for that purpose, but, in the way the Chairman put it, he thought there was some ground for the idea. The company would have no objection in removing its name from the Government stamp; it could protect itself against fraud in other ways.

The witness handed in an analysis made by Mr. Umney which, he said, showed the presence of vegetable extracts in Seigel's Syrup. The Chairman said this analysis would be compared with the report of the Government analyst when that had been received.

The examination of Mr. J. C. Umney, of Messrs. Wright, Umney and Layton, Ltd., owners of various proprietary preparations, was then continued. The witness stated that, having made an analysis, he was satisfied as to the presence of vegetable constituents in Seigel's Syrup, and, if he felt at liberty to do so, he could name the ingredients. Explaining his methods of analysis, the witness said he determined three of the vegetable ingredients by taste and smell principally, and if he had more material and more time he had no doubt that he would be able to determine the whole of them. He laid great stress on the importance of taste and smell, and the actual experience gained in the handling and preparation of drugs, in arriving at an accurate analysis of such a mixture as Seigel's Syrup. No analyst, however high his reputation, was capable of giving as trustworthy an analysis as was to be obtained in a manufacturing chemist's laboratory where preparation of drugs was constantly in progress. The witness was frequently consulted by professional analysts, and asked to give an opinion by taste and smell only as to composition of various mixtures.

In reply to Mr. Bathurst, the witness said he would probably be able to tell every ingredient in Seigel's Syrup by taste and smell alone.

Replying to Dr. Lynch, the witness criticized the views of Mr. Harrison, the analyst to the British Medical Association, as to the analysis of vegetable extracts, and said there were in the *British Pharmacopoeia* 230 or more vegetable preparations, only 44 of which could be standardized by chemical methods.

The Chairman remarked that this was a most important statement, because, if correct, any one might put a few grains of extractive matter from a large number of drugs into a mixture, and there would be no chemical means of testing the claim that the preparation contained these. The witness said that if the quantities were infinitesimal that would be so.

In reply to Mr. Glyn Jones, the witness said his company did a limited business in stock mixtures for the use of medical men; these were sold to doctors who did their own dispensing. As to the cost of the ingredients of secret remedies, his view was that there was no relation, in the case of many drugs, between their medicinal value and their cost. On the practicability of making an analysis from a single bottle of such a preparation as Seigel's Syrup, the witness expressed the opinion that to make anything like a correct analysis about two gallons of material would be required. An analyst must be specially qualified by experience in handling drugs to analyse such a mixture.

The examination of the witness had not concluded when the Committee adjourned.

CANCER RESEARCH.

IN the article by Dr. Bashford published in the JOURNAL of May 27th, 1911, it was implied (p. 1230) that the managers of the Manchester Royal Infirmary had accepted money for the promotion of cancer research, but had forbidden experiments on animals to advance this end; and further, that contributions had been accepted from an antivivisection society. The Chairman of the Medical Board of the Infirmary (Dr. Ernest S. Reynolds) informs us that he has made careful inquiry into the possible basis of any charge of unworthy action by the authorities of the Infirmary, and is satisfied that they have absolutely no foundation. The research instituted at Manchester was into certain chemical problems relating to cancer, and from the nature of the research, experiments on animals were deemed to be unnecessary. We unreservedly express regret that an incorrect view of the attitude of the responsible managers of the Royal Infirmary should have been given in the BRITISH MEDICAL JOURNAL.

THE late Mr. Thomas Bartlett, of Liverpool, in addition to other large public bequests, left £20,000 to the Home for Epileptics, Maghull, for the erection of a home to be called the "Thomas Bartlett Home"; a similar sum to Liverpool University for the establishment of scholarships for engineering students, and sums sufficient for the endowment of beds to the following hospitals: The Royal Infirmary, the Royal Southern, the David Lewis Northern, and the Stanley Hospital.

ROYAL MEDICAL BENEVOLENT FUND.

At the November meeting of the Committee 29 cases were considered, and grants amounting to £280 made to 25 of the applicants.

Appended is an abstract of the cases relieved:

1. Daughter, aged 50, of late M.D.Edin. Capital entirely exhausted by unavoidable expenses due to prolonged and severe illness, and is now dependent on friends for shelter. Relieved three times, £34. Voted £12.
2. Widow, aged 50, of M.B.Edin. No income; endeavours to support herself by letting rooms, and receives slight help from a daughter. Voted £5.
3. Widow, aged 60, of L.R.C.P.Edin. Quite unprovided for at husband's death a few months ago, and finds great difficulty in obtaining employment. Voted £10.
4. Daughter, aged 61, of late M.R.C.S. Tries to maintain herself by taking boarders, but has nearly exhausted her small capital, and is in bad health. Voted £12.
5. Daughter, aged 31, of late M.R.C.S. Has been obliged to give up her situation on account of ill-health, and is consequently dependent upon her mother, an annuitant of this Fund. Voted £5.
6. Widow, aged 72, of L.R.C.P.Edin. Has a pension from a charitable society, but requires help owing to the ill-health of a daughter. Voted £5.
7. Son, aged 18, of late M.R.C.S. Earns £50 a year as a clerk, but asks for a little help towards the expenses of his mother's funeral. Voted £5.
8. Daughters, aged 60 and 55, of late M.R.C.S. No income; small earnings from needlework, and receive slight help from friends. Relieved eight times, £114. Voted £20.
9. Widow, aged 51, of L.R.C.P.Ireland. No income, and health feeble. Is temporarily in charge of a furnished cottage, but has to find food, etc. Relieved five times, £60. Voted £12.
10. Widow, aged 54, of L.F.P.S.Glasg. Tries to support herself by receiving boarders but finds great difficulty in obtaining them, and has had a very bad season. Relieved twice, £20. Voted £10.
11. Widow, aged 65, of L.R.C.P.Edin. Was left quite unprovided for at husband's death a few years ago, and has since developed a chronic complaint by which she is quite incapacitated. Is given a home by a sister, but asks help towards the unavoidable expenses of an attendant. Relieved three times, £36. Voted £12.
12. Widow, aged 75, of M.D.Lond. Has two small annuities but is crippled by chronic rheumatism, and asks help to obtain a few small comforts and necessary clothing. Relieved seven times, £41. Voted £5.
13. Widow, aged 65, of L.R.C.P.Edin. Has a small pension but it is insufficient for bare necessities, and applicant is in bad health. Relieved five times, £37. Voted £10.
14. L.R.C.P.Edin., aged 55. Used to practise in Glasgow, but has been in bad health for some years, and is now incapacitated by spastic paraplegia. Is given a home by a sister, who can ill afford to help. Relieved eight times, £96. Voted £12.
15. Daughter, aged 67, of late M.D.St. And. Income less than 10s. a week, and in such bad health that active employment is quite impossible. Relieved five times, £60. Voted £12.
16. Widow, aged 53, of L.S.A. No income and occupation impossible on account of deafness and defective eyesight. Slight help from a son earning 22s. a week. Relieved six times, £76. Voted £18.
17. Daughter, aged 65, of late M.R.C.S. Income less than 10s. a week, and has always been in delicate health. Relieved four times. £48. Voted £12.
18. Daughter, aged 60, of late L.R.C.P. Is mentally deficient, and has been for many years dependent on a sister who is a nurse. Relieved seven times, £80. Voted £12.
19. Daughter, aged 59, of M.D.Lond. Used to partially support herself by teaching, but is now, owing to age and ill health, dependent for shelter on a sister whose income is very small. Relieved twenty-nine times, £218. Voted £12.
20. Daughter, aged 58, of late L.S.A. Has been in feeble health for many years, and is now only able to earn a few shillings a month. Slight help from a relation. Relieved thirteen times, £122. Voted £15.
21. Widow, aged 71, of L.R.C.P.Edin. Entirely dependent on an old age pension and the help from this fund. Eyesight failing and crippled by rheumatoid arthritis. Relieved five times, £60. Voted £12.
22. Daughter, aged 53, of late L.R.C.P.Edin. No income, and quite unable to maintain herself on account of chronic ill-health. Slight help from an uncle and a brother. Relieved three times, £32. Voted £12.
23. Widow, aged 67, of M.R.C.S. Lives rent free at a Ladies' Home and has a pension of £10 per annum, but requires a little further help. Relieved three times, £36. Voted £6.
24. Daughters, aged 60 and 54, of late M.R.C.S. No income; endeavour to support themselves by taking boarders and receive a little help from relations; health indifferent. Relieved three times, £46. Voted £18.
25. Daughter, aged 64, of late M.R.C.S. No income; slight help from relations; health very bad. Relieved six times, £72. Voted £18.

Contributions may be sent to the Honorary Treasurer, Dr. Samuel West, 15, Wimpole Street, W.

LITERARY NOTES.

The *Universal Medical Record*, to the birth of which into the journalistic world we called attention in our issue of June 29th, takes for its province the seeking out of "those contributions of the medical sciences, those indications of moving opinion, those suggestions of practical importance which deserve the attention of medical men who desire to keep abreast of the times." How well it fulfils this function will be gathered by a glance at the first half-yearly volume (January to June, 1912) now before us. It is not by any means a mere collection of abstracts; it contains valuable original articles, reviews, and excellent digests of recent knowledge on special subjects. The busy practitioner will find it a most useful help in his daily work.

An amusing collection might be made of samples of medical terminology culled from the newspapers. On November 22nd the *Daily Mail* informed the world that the St. Petersburg correspondent of the *Vossische Zeitung* had learnt "from absolutely reliable sources" that the Czar's son is suffering from "tubercular coxitis and *haemophilitis*." It is no wonder that the little patient is said to be in a bad way.

The *Boston Medical and Surgical Journal* states that a newspaper, in announcing that a patient had gone to hospital for operation, stated that "his finance accompanied him, and remained with him throughout the ordeal." It is to be supposed that it was the poor man's *fiancée* that accompanied him, but the statement as it stands suggests that before going into hospital he had followed Iago's advice to Roderigo and put money in his purse. Or did he expect that evacuation of what Rabelais calls the *apostume pécuniaire* would be performed? If so, he must have been agreeably surprised that his "finance" remained with him throughout the ordeal.

Ever since the wreck of the *Titanic* communications purporting to come from Mr. W. T. Stead have been appearing in *Light*. They seem to be regarded as revelations from the unseen by the spiritualistic admirers of that enterprising journalist, though to the mind of the "average sensual man" they are more amusing than edifying. Possibly, however, the example of Mr. Stead, who, it may be remembered, induced Mr. Gladstone to give his views of Mr. Lloyd George's budget, has stimulated a greater shade to give his impressions of present-day medical politics. The following letter, which is entitled "Sir Thomas Browne at the Representative Meeting," has been forwarded to us by "his humble correspondent, Dr. Muir Evans, of Lowestoft":

Sir,—There is a weakness in understanding without examination and assenting unto things which from their nature and source do carry no persuasion. Words in the mouth of a Politician do carry a conventional significance and convey a meaning other than ordinary parlance. Thus it behoves us to be rather cautious than confiding, and to dissect their decisions before deciding on their acceptance. There is a sturdy doubt and boisterous objection to that Medical benefit which would raise us from the pit of the Clubs, that we may be sold in bondage to the Commissioners for nine pieces of silver. It is a practical utility and a useful technicality to encompass the unwary with generalities. Let your propositions be defined after the mystical method of the Law and the optimistically obtuse will accept your obscure obligations.

The horizon of a physician of assurance will be bounded by a common capability and the ultrascopic conditions will be encircled in the Sphere of a Specialist. Nevertheless certain special services will revolve in the orbit of the ordinary practitioner, and will carry a sinister perquisite for his dexterity. His Conduct will be controlled by Committees, and the altitude of his Art will be elevated and maintained by inspection, while his Science will become the servant of supervision.

His extraordinary itinerary will receive no remuneration and his increased correspondence no corresponding consolation; and in the keeping of books there is no end.

These regulations, with swarms of others, have been delivered in the leaflets of the Commissioners, whose verities are only supported by their authorities, but being neither consonant with reason nor correspondent with rectitude, their acceptance carries no weight with my considered intelligence.

There is a rabble even among politicians, but we deserve a worthy recompense for our well-intended endeavours.

I remain,

Your obedient Servant,

THOMAS BROWNE, Kt.

The author of the *Religio Medici*, while he lived upon earth, thought nobly of his profession. This letter would seem to show that he still has the same regard for its dignity that marked him while he was visible in the flesh at Norwich.

British Medical Journal.

SATURDAY, NOVEMBER 30TH, 1912.

THE LATEST PROPOSALS OF THE GOVERNMENT.

THE attention of every member of the profession is called to the special notice issued to the profession by the State Sickness Insurance Committee of the British Medical Association this week, and published on the first page of the SUPPLEMENT.

The revised and final proposals of the Government with regard to medical benefit will be issued next week, and will be published in the issue of the JOURNAL bearing date December 7th. It is of the utmost importance that no arrangements, provisional or other, should be entered into with Insurance Committees or with any other bodies by local Medical Committees or Divisions of the Association, or by individual members of the profession, before there has been time and opportunity to consider the terms and conditions embodied in the new documents to be issued next week, and to decide whether or not the terms and conditions shall be accepted.

Local Insurance Committees in some parts of the country are anxious to set on foot arrangements for bringing medical benefit into force. The profession must everywhere reply that no discussion, even of a preliminary nature, can be entered on before the new position has been adequately considered by all members of the profession throughout the country.

The Divisions of the Association in the United Kingdom will hold meetings at the earliest convenient date. At these meetings every member of the Association will be called upon to vote whether he will or will not accept the terms now proposed. Members of the profession who are not members of the Association will be invited to attend these meetings and to express their opinion. The votes of all present and voting will be recorded in two classes—those of members of the Association and non-members respectively—and the combined record of all votes of members of the Association for and against acceptance will be decisive, the votes given by non-members of the Association being recorded for information.

On the day following the Special Representative Meeting last week a letter was sent to the Chancellor of the Exchequer transmitting the resolution adopted by the Representative Meeting on November 19th directing that a copy of the resolution expressing the opinion that the Regulations issued by the Insurance Commissioners and the latest proposals of the Chancellor of the Exchequer were unworkable and derogatory to the profession, and that as a consequence the medical profession declined to undertake service under the Act and Regulations as at present constituted. The letter further intimated that the Representative Body had chosen five special representatives to have an interview with him if he so desired. The Chancellor of the Exchequer invited the representatives to meet him, and the interview took place on Monday morning, November 25th. Mr. Lloyd George was accompanied by the Insurance Commissioners and certain officers of the Commission, and all the representatives of the Association were present—namely, the Chairman of Council (Dr. J. A. Macdonald), the Chairman of Representative Meetings (Mr. Verrall), and the Deputy Chairman of Representative Meetings (Mr. Turner), Dr. R. M. Beaton, and Dr. T. A. Helme, together with the Medical Secretary. In the afternoon the conference was resumed between the representatives of the Association and the medical members of the Insurance Commissions, and on the following evening the five representatives had a final interview with Mr. Lloyd George. A memorandum on the interview, embodying the views of the Chancellor of the Exchequer, was submitted to the meeting of the State Sickness Insurance Committee on Thursday, November 28th, and a special meeting of the Council of the Association has been summoned for Wednesday next, December 4th, to consider the memorandum and the observations of the State Sickness Insurance Committee thereon.

The Council in transmitting the documents to the Divisions will accompany them with a report on the situation.

THE HYGIENE OF THE BRAIN WORKER.

BRAIN workers, like those whose sphere of labour is more mechanical, suffer from what may be called in a special sense professional diseases. These depend partly on the nature of the work, partly on the conditions under which it has to be done. The life both of the scientific and the literary worker is one that places great strain on the nervous centres. The brain, like the muscles, is liable to fatigue when used too intensely or too long. This fatigue is the result of a process which brings about changes in the constitution of the blood. These necessarily react on the circulatory apparatus, causing more or less disorder in its action. This disorder is re-echoed throughout the system; the stomach, the liver, and other organs suffer to some extent, each after its kind. In a word, fatigue of the brain entails fatigue of the body generally. Even the muscles lose something of their vigour, and diminution takes place in the resistance of the body to harmful influences, such as heat, cold, and wet, and to the inroads of the microbes which, like Satan, are constantly going about the world seeking whom they may devour. It has been proved experimentally that brain work causes actual waste of tissue, an amount of organic refuse being thrown out of the body which corresponds to the intensity of the mental activity. It has also been shown by the thermometer that the brain is heated by work; this, of course, means increased combustion. An old physician, Sanctorius, who spent a large portion of his existence in weighing himself in a balance, proved that the body loses weight after mental, as after physical, exercise. Hence the very conditions of intellectual work tend to upset the balance of power in the organic functions of the body which constitutes health. When depressing influences, such as poverty, anxiety, pain or ill-health, are added to these conditions, the strain of the ntellectual life is at its maximum.

Among the main causes of the strain of brain work is the want of sufficient sleep. Some workers find the still small hours of night the best for production. With them we are not here concerned; we have in view those unfortunates who have perforce to steal from the night many hours that should be given to sleep. Want of sleep will in time wear out the finest and strongest brain. All sorts of diseases—neurasthenia, melancholia, disordered nutrition, convulsive disorders—result from want of sleep. Bacon was right when he said that nights passed without sleep shorten

life. Of course, as in everything else, the widest differences may be observed between one person and another in regard to the amount of sleep required. We are speaking of regular work, not of special efforts, when even men who normally need many hours of sleep will, under the stimulus of some important task that has to be finished within a given time, do with only a small fraction of their ordinary allowance. Scott said he could not work with less than seven hours of complete unconsciousness. On the other hand, there is Littré, who, during the last years of his life, never gave more than five hours, and often less, to sleep. As the story points a useful moral, it may be told in his own words. He had just begun his great dictionary when, at the age of 60, he had a serious attack of bronchitis. He recovered, but the illness led him to consider the situation in regard to the gigantic task he had undertaken. Assuming that he might reasonably expect to live till 70, he calculated that to finish his work in time he would have to work thirteen hours a day. He says: "My arrangement extended over the twenty-four hours of the day, of which it was essential that the least possible amount should be given to the current exigencies of existence. . , . I rose at eight o'clock in the morning—very late, it may be said, for a man pressed for time. Wait. While my bedroom, which was also my study, was being done, I went downstairs, taking some work with me. In this way, among other things, I wrote the preface to my dictionary. The Chancellor d'Aguesseau had taught me not to despise the moments in which there seemed to be nothing to do. His unpunctual wife always kept him waiting for dinner, and he presented her with a book, saying, 'Here is the product of the minutes passed in waiting for dinner.' At nine I went upstairs, and up to luncheon time corrected the proofs which had come in the interval. At one o'clock I was back at my desk, and there till three in the afternoon I did my work for the *Journal des Savants* which had elected me in 1855, and to which I made it a point to send my contribution regularly. From three to six I worked at the dictionary. At six o'clock I went down to dinner, which was always ready, for my wife was not like Madame d'Aguesseau. For this one hour sufficed. Getting back to my room about seven, I again took the dictionary in hand and did not leave it again. A first 'shift' carried me to midnight, when my family left me. A second took me to three in the morning. Usually my daily task was finished; if it was not, I worked on; and more than once, during the long days, I have put out my lamp and continued to work by the light of the rising sun. But do not let us make a rule of the exception. Most frequently three o'clock was the time at which I left pen and paper and put all in order, not for the next day, for it had already come, but for the next task. My bed was near at hand, almost touching my desk, and in a few minutes I was in it. Habit and regularity had extinguished all excitement of work. I went to sleep as easily as a man who had nothing to do, and it was thus that I got up at eight."

It may well be asked if Littré could have accomplished his task if he had suffered from insomnia. And how many intellectual workers could stop the activity of their brain as one stops a machine, and at once go to sleep? Napoleon could do this in the active period of his life, and Gladstone had the same invaluable power; it is on record that after he delivered his memorable speech in introducing the first Home Rule Bill he at once went home and slept peacefully while the debate raged fiercely in the House. In the case of Littré, however, it should be added that the want of exercise finally produced stiffening of the joints to an extent that towards the end made him almost incapable of movement. Apart from meals, his only recreation was change of work. But Nature is not thus to be cheated of her rights. Southey, too, thought to do without rest, passing from history to poetry and from poetry to the writing of review articles, and the end was that he sank into a state of imbecility, from which he was released only by death.

Of the manifold digestive troubles to which the brain worker is subject, little need be said. They are not in any sense peculiar to him. But they are grievous hindrances to production. As the poet says:

> Who'd pique himself on intellect whose use
> Depends so much upon the gastric juice?

Carlyle's sufferings from "bile" are writ large through many volumes of reminiscences and correspondence. Darwin, whose digestion was wrecked by years of seasickness, wrought a mighty revolution in scientific thought notwithstanding his feeble health, by carefully husbanding his strength and regularly using the few hours of each day he could work. Dryden prepared himself for the visitation of the divine afflatus by physic and "blooding." Byron, too, found a source of inspiration in Epsom salts, which he says acted on him like champagne. There can be no doubt that the liver, which was regarded by the ancients as the seat of the passions, is readily disturbed by mental emotions. Anxiety as to the fate of a book, an article, or a paper, or as to the result of an experiment, may not only disorder the function of the liver; worry may even indirectly cause organic disease. For this reason, among others, brain workers will do well to suppress feelings of jealousy and keep their temper under control. As Sir Andrew Clark used to say, only a very strong man can afford to be angry. Of that bugbear of modern life, neurasthenia—which our rude forefathers called the "vapours" and the "spleen"—it may be said that, like charity, it covers a multitude of sins—of commission on the part of patients and of ignorance on the part of the doctors. It may be the result of overwork, as of excesses in less creditable directions; and it reveals itself in a feeling of general unfitness for the struggle of life, sometimes accompanied by pain, especially a sensation of compression of the head, either on the top or all over, which the French picturesquely call the "neurasthenic helmet"—*casque neurasthénique*. A particularly unpleasant feeling is one as of an iron hand gripping the back of the brain. If this occurs habitually, it must be taken as a sign that the stress is near the point of what engineers call "breaking strain." Among other symptoms are pains in the back and elsewhere, dilatation of the stomach and utter disorder of the digestion, giddiness, disturbance of vision, hearing, and taste, over-sensitiveness of the skin, inability to walk any distance or to make an effort, and other nervous troubles which add to the patient's sufferings.[1] The very thought of work is torture, and the victim after a time falls into a state of melancholia.

"He jests at scars that never felt a wound," and it is easy for the lucky people who have "no nerves" to dismiss the sufferings of the neurasthenic as imaginary. It should be clearly understood that, whatever neurasthenia may be, it is a real disease. It assumes many different forms, but it is not a mere "ragbag of heterogeneous sets of symptoms," to use

[1] Gélineau, *Penseurs et Savants—Leur Maladies; Leur Hygiène*, Paris, 1901.

the happy phrase of Sir Clifford Allbutt, whose article in the *System of Medicine* (vol. viii, 1910) is a lucid exposition of an obscure subject. Dr. G. M. Gould, of Philadelphia, attributes most of the ills that flesh is heir to to "eye-strain"—that is, to use of defective eyes without correcting glasses. To this cause he traces the ill-health of Darwin, Huxley, Balzac, and, generally speaking, all invalids of literary or scientific distinction of the past hundred years. There is no doubt a substratum of truth in his theory, but he has built on it a vast edifice of questionable dogma.

Of the evils of alcohol and of the still more baleful enchantments of what Théophile Gautier called "artificial paradises" we need not dwell. Intellectual workers, because of the nervous exhaustion caused by their work, are, perhaps, more particularly exposed to become the bond slaves of such Circes. The consequences are known to all, and the only advice that can be given is not to trust to one's strength of mind, but to flee from temptation. It is a case in which the text, "He that loveth danger shall perish in it" is especially applicable.

As regards eating, the best counsel is that a man should be guided by his own experience of what is good and bad for him. Herbert Spencer burnt everything he had written while he avoided the flesh-pots, but many thrive on the Pythagorean diet. There is no special brain food. "Fletcherism"—which may be said to be the application to eating of the words of the poet, "The mills of God grind slowly, but they grind exceeding small"—has an element of good in it, for there are few of us who, like Gladstone, give thirty-two bites to each morsel; but if faithfully practised it seems to be, in a new sense, living to eat. Of smoking, we need only say that it is hurtful in excess, but exactly the same thing may be said of bread. What is excess? That each one must determine for himself.

In the matter of exercise, too, many men cannot do without a considerable amount; others keep "fit" with little or none. There is this to be said about exercise in relation to the brain worker—the time for it must be judiciously chosen. Like all effort, it entails expenditure of nerve force. There are few men like Lord Courtney, of whom Delane said that he required a walk of several miles to bring him down to the intellectual level at which he could educate the mind of the ordinary man. The brain worker should carefully husband his nervous energies.

A word of warning as to intermittent excesses in the way of exercise may not be out of place. Men who lead a sedentary life rush off to the country for the week-end and play golf or tennis, or take long walks all the time, returning to town on Monday feeling the reverse of "fit." They have, in fact, fatigued their muscles with work to which habitual inaction has made them unequal, and the result is that they are poisoned by an excess of waste products, engendered by the unwonted exertion. These toxic matters find their way into the blood and cause the general weariness which is the characteristic symptom of this kind of poisoning. It is these that cause what is known as "gymnastic fever," a sensation which is familiar to unseasoned Alpine climbers, and which can be shown by the thermometer to be a real thing, not a fancy. Till an antitoxin is discovered which shall neutralize the toxin of fatigue, we would urge all brain workers not to be too strenuous in their employment of the week-end holiday. It is an excellent thing in itself, but if abused is likely to lead to worse evils than those it is intended to counteract.

SPADEWORK IN EUGENICS.

Those who are desirous of arriving at an estimate of the present state of knowledge in all that concerns the science of genetics, the nature of the experimental work now being done in its various departments, the paramount views in regard to competing hypotheses, and the prospects, immediate or remote, of important practical applications, cannot do better than study *Heredity and Eugenics*,[1] a volume embodying the substance of a course of lectures delivered by the five authors in 1911, at the University of Chicago. The general aspect of the subject is dealt with in the opening chapter, which includes a brief account of the successive attempts at explanation of the fact of organic evolution, from Goethe and St. Hilaire to Mendel, de Vries, and Galton. In the section of this chapter in which he deals with heredity, Professor Coulter gives a lucid explanation of the Mendelian conception, of the extraordinarily illuminating and stimulating effect of which upon many lines of research the present volume bears abundant evidence throughout. In the second chapter the same writer deals from the cytological standpoint with the physical basis of heredity, favouring the current view which regards the chromatin as the carrier of transmissible characters. Here it is pointed out how aptly the observed facts of heredity, as formulated in Mendel's law, coincide with the typical phenomena of sexual fusion and fertilization, the essential feature of Mendelianism being (to quote Professor East, in a later chapter) "the segregation of potential characters in the gamete in a state of apparent purity, and their recombination by the law of chance through random mating." The advantage of sexual reproduction over parthenogenesis as a factor of evolutionary progress consists mainly in the new combinations which by the former method are constantly being brought about.

Professor Castle, in a chapter dealing with the method of evolution, champions Darwin's view of the paramountcy of selection as against the more extreme advocates of mutation. It is a mistake to suppose that Darwin overlooked the possibility of the sudden origin of new races. And experiment shows that new characters, at first feebly manifested, can be augmented and established as racial traits by artificial selection. Thus, from the descendants of a guinea-pig possessing an imperfectly developed fourth toe Professor Castle succeeded in producing a high percentage of well-developed polydactylous individuals. Mutation is to be interpreted as the sudden loss or profound modification of a given unit character. Its occurrence and importance are undoubted; on the other hand, the cumulative effect of slight, almost imperceptible modifications, affording a basis for the action of selection, is by no means negligible or even subordinate. A chapter of special interest to medical readers is that devoted to heredity and sex. In this the inadequacy of the evidence for the nutritional determination of sex is exposed. The author upon the whole favours the hypothesis that sex has its beginning in gametic differentiation, and is finally determined in the fertilized egg by the nature of the uniting gametes. Granted the truth of this theory, he sees little hope that the breeder will ever be able to control sex, except in the case of species where parthenogenesis is an alternative

[1] *Heredity and Eugenics*: A Course of Lectures summarizing Recent Advances in Knowledge in Variation, Heredity, and Evolution, and its Relation to Plant, Animal, and Human Improvement and Welfare. By William Ernest Castle, John Merle Coulter, Charles Benedict Davenport, Edward Murray East, William Lawrence Tower. Chicago: The University of Chicago Press; London: The Cambridge University Press. 1912. (Med. 8vo, pp. 319; figs. 98. 10s. net.)

method of reproduction. "In the higher animals male and female zygotes should for ever continue to be produced in approximate equality, and consistent inequality of male and female births could only result from greater mortality on the part of one sort of zygote than of the other."

In an interesting discussion of inheritance in the higher plants, Professor East shows how various departures from the normal ratio can be explained conformably with Mendel's law. One of the simplest examples is that of the dihybrid ratio, which obtains when the parents differ by two character pairs. This is the algebraic product of two (3 + 1) ratios. Variations from the normal ratio due to this cause afford instances of "latency of separation," and such aberrant or seemingly aberrant ratios occur where the full inheritance of a given character depends upon the interaction of two or more distinct and separable gametic factors. Another form of latency, called that of hypostasis, is mere invisibility of an inherited character, which is obscured by another (epistatic) character. The same writer calls attention to the interesting fact that, in addition to the uniting of the hereditary factors involved, the fusion of two gametes into a zygote, which constitutes an act of fertilization, effects a stimulation of the process of cell division resulting in growth and development. This stimulus is generally far more conspicuous in the case of a hybrid or heterozygote than in a pure bred (homozygous) individual. While it is in general true that the cross-breeding of species makes for vigour, it is found that species vary in their affinity to cross with other species. "With perfect ease of crossing the stimulus is roughly a function either of the number or of the kind of character pairs for which the individual is heterozygous."

Professor Tower gives details of some experiments conducted by Castle with a view to settling the question whether, and how far, somatic influences affect the germ plasm. These took the form of transplantation of the ovaries from guinea-pigs to others of a different strain. The experimenter's conclusion is that the egg-cell remains unaffected. Professor Castle's own experiments with beetles, which were subjected to abnormal conditions of temperature and humidity, gave similarly negative results. On the other hand, by a combination of external stimuli with selective accumulation, permanent modifications not merely of the colour but of the pattern-distribution in chrysomelid beetles were obtained. The present position and prospects of social eugenics are very briefly reviewed by Mr. Davenport, but he provides much interesting information with regard to the inheritance of sex-limited and other traits, and some striking examples of the significance of the quality of the human germ-plasm, and of its unlimited potentialities for good or evil.

PROGRESSIVE LENTICULAR DEGENERATION.

UNDER this title Dr. S. A. Kinnier Wilson describes in the current number of *Brain*[1] a group of cases which present such definite features as to justify the addition of one more to the list of known diseases. The paper is based upon the records of 12 cases (with 10 autopsies), of which 4 (with 3 autopsies) were studied personally by the author. In all, 14 cases are known to be described in medical literature.

[1] Vol. xxxiv, Part IV.

The chief features of the disease are tremors of the limbs, and later of the head and trunk, with stiffness and weakness of the muscles generally, causing difficulty in speaking and swallowing; the patient is emotional. The disease progresses with pyrexia, wasting, and muscular contractures, and ends fatally. After death the liver is found to be cirrhotic, and the lenticular nucleus of the brain is softened or destroyed on each side. It is a disease of the young, affecting both sexes, and runs in families, but is not known to be passed from parent to child.

The first cases, in a brother and sister, were described by Sir William Gowers in 1888, under the title "tetanoid chorea associated with cirrhosis of the liver." In 1890 Homén of Helsingfors and Dr. J. A. Ormerod in this country published cases in which the lesions in the lenticular nuclei were recognized and carefully examined.

The illness comes on insidiously in young people who have been in good health. In one case jaundice occurred four years before the hand began to shake, but in most the liver affection is unsuspected until it is found after death. The first striking feature is the motor disturbance. The tremor may be noted early in the hand, probably because the writing deteriorates; it is increased by attention—as, for instance, when trying to touch the nose with the finger. Involuntary tonic spasms follow, which easily become clonic. Stiffness affects all the muscles in course of time, except those of the eye; it causes the face and mouth to be immobile, and interferes with speech, mastication, and swallowing. The muscles are not paralysed, but, owing to their stiffness and weakness and to the contractures which develop, the patient is as badly off as if they were. The skin and tendon reflexes are unaltered, though the spastic muscles may make it hard to obtain them. The patients tend to become weak-minded, especially to laugh very easily, but when allowance is made for the interference with speech they can hardly be called demented.

In three of the more acute cases the illness lasted four months, six months, and thirteen months respectively. The temperature was high and irregular and emaciation rapid, the whole aspect of the patient suggesting an infective state. In nine chronic cases nutrition was maintained for a year or two, the disease proving fatal in from two and a half to seven years.

It is clear that these symptoms cannot be classed under any known disease. They differ from those of disseminated sclerosis in that there is no nystagmus or optic atrophy and the course of the disease is shorter. The motor tracts are not involved. The resemblance to bulbar paralysis is dispelled by a careful examination of the tongue and palate, which in progressive lenticular degeneration are stiff but not actually paralysed. In many respects there is a likeness to paralysis agitans, which, however, occurs at a later period of life and has a longer course.

Comparatively little is known of the part played by the masses of nervous tissue known as the basal ganglia. The lenticular nucleus is part of the corpus striatum. It lies between the cerebrum and the pons Varolii, in front of the optic thalamus and by the side of the internal capsule. Any gross lesion of this part could not fail to involve the internal capsule and cause the pyramidal tracts of the cord to degenerate; in this disease, however, the grey matter of the nucleus appears to be picked out by some selective agent, the pyramidal tracts being unaffected. The lesion varies from discoloration and sponginess to complete excavation. Microscopically, there is overgrowth of the glial tissue followed by degeneration. The cirrhosis of the liver is of the multilobular type,

and is found advanced in degree. The spleen is enlarged.

It may be supposed that some poisonous substance is present which has a special action on the lenticular nucleus, but whether it arises from the cirrhosed liver or is a common cause of both lesions can only be conjectured. There are no grounds for believing that syphilis is a cause. The author thinks that the disease is not microbial, but this opinion cannot be said to be established. Dr. Wilson is to be congratulated upon his exhaustive and convincing paper. If we have a regret, it is that the title leaves out all reference to the cirrhosis of the liver, which, although it commonly gives rise to no symptoms, appears to be an essential part of the disease.

THE DOMINION MEDICAL COUNCIL.

THE meeting for the organization of the Medical Council of Canada (Dominion Medical Council) was held in Ottawa on November 7th and two following days. Dr. Roche, Minister of the Interior (until recently Secretary of State) presided. Dr. T. G. Roddick was unanimously elected president; Dr. R. S. Thornton of Deloraine, Manitoba, vice-president. Dr. R. W. Powell of Ottawa was appointed registrar, and will take official control in June next. A representative executive committee of five was also elected, the president and vice-president to be *ex officio* members. Much work was done in the three days, and the regulations will now be submitted to the Governor-in-Council. To allow time for the completion of the necessary formalities the Dominion Medical Council adjourned until June, when it is hoped that practically everything will be ready for examination and registration as provided for in the Act. Every delegate was present, making in all thirty-one, and much enthusiasm was shown

WORLD-PROGRESS IN LLUMINATION.

THE flattering unction can be laid to the patriotic soul that at least in one respect Britain leads the world. Only a few years ago illuminating engineering might have been described as the Cinderella of industrial sciences. At present, thanks in great measure to the impetus which has been given to the subject in this country where the hygienist has been brought definitely into association with the engineer, it is claiming world-wide attention, and Britannia's trident might well be exchanged for a torch. Mr. Leon Gaster, the Honorary Secretary of the Illuminating Engineering Society, had a cheering tale to unfold at a meeting of that body on November 19th, when he summarized his observations made during recent visits to the Continent and the United States. In France a Committee on hygienic aspects of illumination has been appointed by the Government, and already is doing useful work. In Belgium the question of promoting a Government commission on the subject of illumination is to be brought before the authorities. At the Congress for the Prevention of Industrial Accidents held at Milan last summer, the subject of adequate illumination as an industrial safeguard was thoroughly discussed, and since then it has excited considerable interest in the Continental press. Most noteworthy is the fact that an illuminating engineering society has just been formed in Germany directly under Government auspices. It has been modelled on the lines of the three-year-old British Society, and has been taken under the wing of the *Reichsanstalt*, the Government establishment at Charlottenburg, corresponding to our own National Physical Laboratory. In the United States this autumn Mr. Gaster found that a great deal of attention was being paid to the problems of illumination, particularly in their hygienic aspect. The American Illuminating Engineering Society is issuing to the public a small primer setting out the fundamental rules of good lighting, irrespective of the particular illuminant in use. The possibilities of the subject have even caught the eye of the editors of New York dailies. America is the chosen home of what is called the "Great White Way" movement, which has gained some footing even in suburban London. Certain streets are flooded with brilliant light, and the effect is spectacular in the extreme, but a little leavening of science into the enterprise would reduce glare and add greatly to public comfort. One hint from America has been taken by the Home Office, for it is the intention of that Department to establish a Museum of Safety in this country similar to the one in New York, and it is hoped that illumination will receive its due share of attention. The Home Office has also promised that a Departmental Committee on illumination shall be appointed to inquire, especially as to industrial lighting; another instance of its activity is the competition it has promoted for new models of miners' lamps, partly with a view to preventing nystagmus. The idea has since been followed up in Germany. A number of the lamps which had been awarded prizes in the British competition, when the first place was taken by a German inventor, were on view at the meeting.

SIR WILLIAM GAIRDNER AND CRIMINAL HEREDITY.

MR. J. D. SHAW, editor of the *Tasmanian News*, has sent an interesting communication to the *Scotsman* (November 21st), in which he recalls a letter addressed to that newspaper by the late Sir William Gairdner on the "Criminal Stigmata Theory" (September 3rd, 1896). In it the great physician related how many years before he had occasion to send a young clergyman, one of the ablest and most open-minded men he had ever known, to Tasmania on account of his health. He went on to say: "I suggested to him, as a point on which he might keep his eyes and ears, and also his mind open, in a quiet way (for there were obvious reasons against obtrusive inquiries into family histories), whether the descendants of the criminal colony, which was unquestionably the original British stock inhabiting Tasmania (or Van Diemen's Land, as it used to be called even in my boyhood), had retained in any degree the criminal or other undesirable taint, at the time of my friend's visit, which was at least a whole generation nearer the original settlement than the present date. Of course, even at that time it was necessary to allow for a considerable dilution of the original penal colony with new and better elements; but it was also reasonable to suppose (on the *necessitarian atavistic* theory, as one might call it), that the traces or 'stigmata,' or whatever a modern criminal anthropologist might call them, of persistent 'degeneration,' and criminal tendencies might still be found among such a population. The information I received was, on the contrary, that the Tasmanians were remarkably free from all such apparent 'reversions' of inherited instincts; and that whether judged by their actual criminal record, or by the number and quality of the insane in their asylums, the race now inhabiting this oldest and probably worst of our penal settlements was as orderly, as flourishing, and well-to-do as in any other colony; and altogether bore most favourable comparison with any other portion of the British stock at home or abroad." Sir William Gairdner, continues Mr. Shaw, did not receive all the information from the young clergyman; but through the late Dr. Andrew Smart, of Edinburgh, Mr. Shaw himself, who had lived twelve years in Tasmania, was asked to furnish the necessary data. This he did, and Sir William Gairdner wrote that the replies were in accordance with his original information, and were based at least on very plausible statistics. Mr. Shaw then sent a batch of printed and other documents, and in acknowledging them, Sir William Gairdner wrote on March 15th, 1897: "I am very much obliged to you for

your documents, and for taking so much trouble to satisfy my curiosity on a matter of public importance, which must, however, wait upon a time of more leisure than at present, as I am in the last week of the medical winter session, with almost overwhelming work." In a subsequent letter Sir William expressed the hope that he would be able to write on heredity, but there appears to be no evidence that he fulfilled this intention. In another letter to Mr. Shaw, Sir William wrote: "I look upon the case of Tasmania as one of the most hopeful and animating barriers to oppose to that kind of *quasi*-scientific pessimism which tends to look upon all criminal and insane tendencies as an ineradicable taint, and thus to circumscribe the action of free will in the individual, and discourage reformatory and punitive measures alike on the part of the State." It is a pity that Sir William Gairdner's final conclusions on the evidence he had collected were never formulated; at any rate, as far as we know, they have never been published.

CERVICAL RIBS.

Although the symptoms referable to the presence of additional ribs in the cervical region in man are well and accurately described in modern textbooks on surgery, the causes leading up to the presence of these "abnormalities" in the human species have so far been by no means satisfactorily explained. Dr. Stapley,[1] in the *Proceedings of the Royal Society of Melbourne*, has considered the question in connexion with some of the mammals that have abandoned quadrupedal progression; and the comparative method of inquiry that he has adopted accentuates the importance of this method when investigating many of the disorders to which man is liable. His main contention is that "cervical ribs develop in the human neck because the lungs have migrated towards and encroached on, the neck;" the facts he makes use of in support of this argument, if not convincing, are well worthy of consideration. He points out that the ribs of fishes, in which the neck is absent, mainly subserve the purpose of protecting the viscera and of giving rigidity to the skeleton. Higher up in the animal scale—for example, in lizards, in which the neck development is still of a low grade, the cervical ribs are continuous with the body cavity and assist in the respiratory movements. In snakes cervical ribs are numerous, but their main purpose is to assist in locomotion. In mammals the thoracic ribs are principally respiratory in function, and any extension upwards of the rib development helps these respiratory movements. The costal process is absent from the seventh vertebra of most quadrupedal mammals who have any extensive neck movement: its presence would only tend to limit such movement. "The seventh neck bone of such animals has been submitted to extinction of its rib vestiges by the hostile attack of neck flexion upon a thoracic base that has been made firm by the lateral pressure of the weight of the body." Hence the value of crawling and quadrupedal games in infancy as tending to keep the child's neck and thoracic girdle as true as possible to the mammalian type. When free neck movement is essential for the general welfare of the individual or species, such movement is not compatible with the presence of cervical ribs which tend to stiffen the neck. It is found, as a fact, that no quadrupedal mammal normally has cervical ribs; they are only found in those mammals that have abandoned this method of progression, such as the three-toed sloth, the porpoise, and man. Owing to man's erect position the relatively heavy heart has tended to gravitate downwards in the thorax, whereas the lighter lungs have been "floated" upwards, and the longer and narrower is the chest the greater is this tendency. The great disproportion in the frequency of cervical ribs in men and women is possibly explained by this fact.

[1] *Proc. Roy. Soc. Victoria*, vol. xxv (new series), Pt. 1, August, 1912.

A SHORT WAY WITH NOSTRUM VENDORS.

It is stated that the United States Post Office Department has ordered the arrest of 175 manufacturers of "patent medicines" on the charge of using the United States mails to advertise "quack" remedies. The names of the persons concerned will not be made known until the warrants have been executed, but it is stated that the list includes a number of millionaires. The action of the Post Office is said to be due to the recent Federal investigation into the many spurious articles offered to the public, which, it is understood, will result in the introduction of legislation for the better control of the "patent medicine" business.

CARLYLE AND DOCTORS.

In Mrs. L. B. Walford's *Memories of Victorian London*, just published by Arnold, it is recorded that, rambling with a friend about Chelsea one day, she came upon Carlyle, who looked old and worn. They were told that he would not see a doctor, and that he declared he would as soon see somebody else, whose name also begins with a D. A friend related the following story: "Did you ever hear how he turned on a poor country practitioner down at my brother-in-law's place, where he had an attack which frightened everybody, for it was uncommonly like cholera, and cholera was about? My brother-in-law took it upon himself to send for the village doctor, a worthy old fellow with a long-established practice, and you may suppose Aesculapius was not a little flustered and flattered at being summoned to such an illustrious patient. With the utmost alacrity he made his way to the Hall, and was shown upstairs to the patient's bedroom, but there his self-complacency received a rude shock. My brother-in-law told me he did not know which way to look when a shaggy head uplifted itself from the pillows and peered over the bedclothes. 'Who's that?' He replied that it was the doctor, whom he had thought it right to send for. 'Doctor?' thundered Carlyle. 'I'm for none of your doctors. Of all the sons of Adam, men of medicine are the most unprofitable.' And the poor unprofitable man of medicine found it impossible to obtain a hearing," said our informant, shaking his head, "and had to retreat ruffled and terrified. The worst of it was that his visit so annoyed and roused the Sage, that it put fresh spirit into him, and he began at once to get better, all the time railing at doctors, and triumphantly pointing to his own case as proving his point against the faculty!" This for all we know may be true, but the Seer of Chelsea, as all the world knows, was a man of moods, and there is a letter of his to Syme which shows him in an altogether different frame of mind. He says there that whoever else is in the wrong way, the doctor with his mission of healing is in the right. We may recall, too, the letter by Dr. Yeats read to the members of the annual meeting at Bristol in 1894 who were present at an excursion to Tintern Abbey. It was addressed to a firm of Edinburgh publishers who had sent him a book published by them written by one who hid his identity under the pseudonym "Therapeutes":

Chelsea 25th Feby 1859.

Dear Sir—I have received your book which you were kind enough to send me, and I beg to return you thanks for the same, It is a book (unlike many that come to me here) of a serious nature, the fruit of long study, meditation, inquiry, and evidently of perfect conviction on your part.

I believe, and have long believed, the essential idea it sets forth to be not only true, but of the very highest importance to mankind, namely, that the Physician must first of all be a priest (that is to say, a man of pious nobleness, devoted to the service of the Highest, and prepared to endure and endeavour for that same, taking no counsel of flesh, and blood, as the theory of Priests is),—first of all, a real priest, and than that the whole world should take supreme counsel of him, as it does of its real or imaginary Priests or Pontiffs this long while back, and follow said counsel as the actual will of God,—which it would be were the Physician what I say.

It is curious to remark that Heilig in our old Teutonic speech is both Holy and also Healthy; that the words Holy and Healthy, as our antique fathers understood them, are one and the same. A thousand times has that etymology risen sorrowfully upon me, in looking at the present distracted position of affairs, which is horrible to think of, if we look earnestly into it, and which cannot well be spoken of at all. We, sure enough, have completely contrived to divorce holiness (as we call it) from health; and have been reaping the fruits very plentifully during these fifteen hundred years.

The notion of bringing our present distracted anomaly of a Physician into union with our ditto ditto of a Priest, and making them identical, is, of course, extremely chimerical; nor can one easily say what ought to be the first step towards bringing each of them back from his anomalous imaginary condition and nearer to veracity, and the possibility of coalescing. But I am very glad to see the idea started, in any form, under any vesture, and heartily wish you success in bringing it home to men's minds.

I remain, yours truly,

T. CARLYLE.

To Therapeutes,
Messrs. Sutherland and Knox,
Booksellers, Edinburgh.

It should not be forgotten that Carlyle's own brother was a doctor, and that in his correspondence he repeatedly acknowledges the kindness of Dr. Peyton Blakiston and other doctors to his wife and himself.

POISONING BY ARSENIC IN CARPETS.

A REPORT by Professor Kuttner[1] tends to show that, though the use of arsenic as a carpet dye is illegal in Germany, poisoning from this source is not rare. The victims complained of chronic diarrhoea, which was intractable at home but speedily disappeared on change of residence. When the patients returned home the diarrhoea recurred in spite of every dietetic precaution. The possibility that the diarrhoea was of nervous origin was at first entertained, for there is such a form of diarrhoea which can be cured by removing the patient from home surroundings. But the patients in question exhibited no signs of neurasthenia or hysteria. One of them, a man aged 32, complained of abdominal pain and the passage every day of six to ten watery motions. These contained unaltered bile pigments, muscle fibres, starch, fat, and mucus. A blood count showed secondary anaemia. After treatment in hospital for sixteen days he was discharged in perfect health, but a relapse occurred within a few days of his return home. Another stay of ten days in hospital was followed by recovery, succeeded again by a relapse on the patient's return home. Arsenic was sought for, and found in the bedroom carpet. A little later a second patient developed chronic diarrhoea, which ceased only when he changed his quarters. An analysis of his bedroom carpet showed large quantities of arsenic. His wife suffered from headaches and lassitude, but not from intestinal symptoms. A third patient developed severe diarrhoea at her first confinement, and for the following year and a half suffered from chronic diarrhoea, which reduced her to a state of profound emaciation and anaemia. Here, again, relief was obtained only by change of residence. Arsenic was found in the urine and also in her bedroom carpet. While the patient had slept with her windows open she had been quite well, and the diarrhoea occurred when, during the puerperium, they were kept shut. It is probable, therefore, that the arsenic reached the system by inhalation. In two women, aged 52 and 56 years respectively, who suffered from anorexia, lassitude, and a tendency to diarrhoea, the blood counts are said to have been characteristic of pernicious anaemia. The bedroom carpets contained arsenic, as did also the urine in one case. Regrettably enough, the urine was examined for arsenic in only two of these five cases. The absence of arsenic from the urine does not exclude arsenical poisoning; nor, on the other hand, does the demonstration of arsenic in a bedroom carpet establish a connexion between it and obscure toxic symptoms. But there is little doubt as to the connexion in the cases recorded, for the reasons given above. As arsenic is also employed in the manufacture of cheap linoleum, its presence in bedrooms must be common, and it is consequently advisable to suspect its influence in all cases of obscure anaemia and intestinal catarrh.

[1] *Berl. klin. Woch.*, November 4th, 1912.

STERILIZATION OF THE SKIN WITH IODINE.

IODINE has never gone out of date as an antiseptic, and practical surgeons have taken to it and proclaimed its value freely during the past five years. Grossich wrote an important communication on the subject in the *Zentralblatt für Chirurgie* in 1908; Dr. Maylard reminded us in October, 1910, that Mr. Bryant employed iodine at the beginning of the Listerian age, and added a letter from that distinguished surgeon, including a statement that he had used it already in 1850, when dresser to Aston Key, on the occasion of an epidemic of hospital gangrene in Guy's Hospital, with results relatively favourable when compared with other therapeutic agents. In August, 1909, we published an important paper by Mr. Lionel Stretton on the sterilization of the skin of operation areas. He strongly advocated iodine on the strength of operative experience, which he tabulated. Dr. J. Wesley Bovée has published a monograph which deserves to be ranked with Mr. Leedham-Green's important communication read before the Surgical Section of the Birmingham meeting last year.[1] Dr. Bovée[2] states that it was recently employed in the Philippines for a Caesarean section. Dr. Bovée now employs a solution of iodine crystals and absolute alcohol. Bovée and Neate found that, as far as could be ascertained by making cultures of epidermic scrapings, weak solutions of iodine, even to 5 per cent. of the official (U.S.) tincture (which is about two and a half times as strong as the *B.P.* tincture), thoroughly sterilize the surface of the skin within from two to fifteen minutes after application. The cultures showed no colonies after incubation for three days. Pubic hair placed in iodine solutions of 5, 10, 20, 30, and 40 per cent. strength of the official U.S. tincture, respectively, for two, three, five, eight, ten, twelve, and fifteen minutes respectively, all showed growths after three days' incubation. When, however, 50 per cent. dilutions were employed, no such growths appeared. Control scrapings of the skin taken from the abdomen above the umbilicus over periods varying from two minutes to as many hours showed, when 40 per cent. dilutions were used, negative results as to colonies. Cultures from hair and skin that had been subjected to 50 per cent. tincture of iodine never produced growths. When Dr. Bovée's researches were discussed before a meeting of the American Gynaecological Society, Dr. Baldy declared that he had a profound distrust for anything which would relegate to the shades soap, water, and the nail-brush. Dr. Grossich has recently collected and revised his earlier published memoirs, embodying them in a monograph which deserves consideration.[3] He has considered all criticisms on his method in an appendix occupying nearly fifty pages in his recent publication. He refers to Major F. J. W. Porter, who follows out his method in its entirety, and to Mr. Lionel Stretton, who is entirely in accord with him as to the value of iodine, although he differs as to matters of detail such as the septicity and disinfection of hairs, a problem which Bovée has endeavoured to solve by the experiments to which we have just referred.

[1] BRITISH MEDICAL JOURNAL, October 28th, 1911.
[2] *Trans. Amer. Gyn. Soc.*, vol xxxvi, for the year 1911, p. 111.
[3] *Meine Präparationsmethode des Operationsfeldes mit elt Jodtinktur.* Berlin and Vienna: Urban and Schwartzenberg. 1911.

DISCOVERY OF ANCIENT HUMAN REMAINS.

FOR some time past it has been an open secret that a discovery of the very highest importance, as regards the early history of the human race, had been made in England. There was also a general agreement that no mention of the event should be made in public until those

who are investigating the geological and anatomical aspects of the discovery had finished their labours and laid them in a completed form before one of the learned societies—in this case the Geological Society. By some means news of this find reached the daily press, and the accounts published are largely imaginary. It may be stated, however, that there cannot be the slightest doubt as regards the authenticity and importance of the discovery, and that a new form or species of primitive man has been found side by side with the remains of animals known to occur only at a late Pliocene or early Pleistocene date. The remains found indicate a more primitive and much older type of man than has yet been found in England. For further details we must wait until the experts have published an account of their investigations. We believe the human remains thus discovered are to find a resting-place in the Natural History Museum at South Kensington.

THE LISTER MEMORIAL.

ONE of the most liberal donations to the Lister Memorial Fund, to which attention was called in the JOURNAL of November 23rd, is that of the Hon. W. F. D. Smith, who gave £500. Lord Rosebery has since given £50, and the total amount so far collected is about £3,650. It is particularly gratifying that among the contributors are so many who are not members of the medical profession. In addition to the names mentioned last week, we see in the list those of Sir James Whitehead (100 guineas), Lord Allerton (5 guineas), Mr. Waldorf Astor, M.P. (20 guineas), Lord Avebury (5 guineas), Mrs. Ayrton (5 guineas), Sir J. Wolfe Barry, (10 guineas), Mr. H. P. Boulnois (1 guinea), Mr. James Boyton, M.P. (20 guineas), Mr. R. H. Burne (2 guineas), Sir Arthur Church (1 guinea), Mr. C. Heath Clark (5 guineas), Mr. Henry Clarke, J.P. (5 guineas), Mr. F. C. Clayton (3 guineas), Sir John Duncan, J.P. (1 guinea), Mr. W. Fleming (1 guinea), Mr. Percy Freeman (1 guinea), Mr. Frederick M. Fry, M.V.O. (20 guineas), Mr. D. M. Stevenson, Lord Provost of Glasgow (10 guineas), Mr. F. DuCane Goodman (£10), Mr. Ludovic Goetz (10 guineas), Sir G. Taubman Goldie, K.C.M.G. (5 guineas), Lord Halsbury (10 guineas), Lord George Hamilton, G.C.S.I. (£5), Mr. Cornelius Hanbury (25 guineas), Mr. Cecil Harmsworth, M.P. (5 guineas), Mr. Alderman C. A. Hanson (10 guineas), Sir John Holder, Bart. (5 guineas), Sir A. B. Kempe (5 guineas), Sir John Larmor, M.P. (5 guineas), Mr. J. H. Lloyd (5 guineas), the Dowager Lady Loch (1 guinea), Sir Oliver Lodge (2 guineas), Sir Norman Lockyer (2 guineas), Professor R. Meldola (3 guineas), Mr. J. H. Morgan, C.V.O. (5 guineas), Mr. Henry Myers (2 guineas), Sir Andrew Noble (£10), the Hon. Sir Charles Parsons, K.C.B. (£10), Mr. J. Luard Pattisson, C.B. (5 guineas), Sir Robert Perks, Bart. (5 guineas), Mr. Francis Reckitt, J.P. (5 guineas), Mr. Leopold de Rothschild (10 guineas), Mr. Joseph Rowntree (5 guineas), Sir William Tilden (1 guinea), the Earl of Cromer (5 guineas), and Mr. Richard Winch (2 guineas). Among the medical subscribers are Sir Thomas Barlow, Sir Douglas Powell, Sir Hawtrey Benson, Sir William Turner, Professor Gilbert Barling, Sir Francis Champneys, Sir Frederic Eve, Sir Rickman J. Godlee, Sir Alfred Pearce Gould, Sir Donald MacAlister, Sir Trevor Lawrence, Dr. J. B. Hurry, Mr. Clement Lucas, Mr. A. E. Maylard, Sir Henry Morris, Professor F. W. Mott, Mr. Edmund Owen, Mr. Herbert W. Page, Professor F. T. Paul, Sir George Hare Philipson, Sir James Porter, Mr. D'Arcy Power, Professor R. Saundby, Professor Schäfer, Professor W. Thorburn, Sir Frederick Treves, Sir John Tweedy, and Sir Hermann Weber. We take this opportunity of reminding readers that donations may be sent to the Treasurers of the Lister Memorial Fund, Royal Society, Burlington House, W.

MR. AUSTEN CHAMBERLAIN has, it is stated, received £48,000 towards the £100,000 which he is raising for the London School of Tropical Medicine.

THE new Pharmacology Laboratories at University College, London, will be opened by Sir Thomas Barlow, K.C.V.O., on Wednesday, December 4th. Lord Reay, Chairman of the College Committee, will take the chair at 5 p.m.

Medical Notes in Parliament.

National Insurance Scheme.

Medical Benefit.

MR. PETO asked the Chancellor of the Exchequer, on November 26th, whether, in view of the resolution passed on November 19th by the Representatives of the Divisions of the British Medical Association, that the provisions of the National Insurance Act were unworkable and derogatory to the medical profession, and that the medical profession declined to take service under the Act and Regulations as at present constituted, he proposed to recast the Regulations for providing medical benefit in such a manner as should not be injurious to medical science and practice in this country; and, in any case, how he proposed to provide the medical benefit offered under the Act to insured contributors. The Chancellor of the Exchequer replied that he was requested last week by the British Medical Association to receive a deputation in regard to certain points in the Regulations relating to medical benefit, and he acceded to their suggestion. He was at present in communication with a committee appointed by the Association for that purpose. In the circumstances he considered that no statement could usefully be made.

State Medical Service.

Mr. Godfrey Locker-Lampson asked the Prime Minister, on November 25th, whether any estimate had been made of how long it would take to establish a State medical service; and whether, in the event of the medical profession refusing the terms of the Government, such a service could be formed in time to supply medical benefit from January 15th next. Mr. Masterman said that careful consideration had been given to the question of the best arrangements to make under the proviso to Section 15 of the Insurance Act, should it be found that the practitioners included in any list were not such as to secure an adequate medical service in any area; but he did not think it advisable at the present time to indicate what arrangements might have to be adopted in the circumstances suggested in the last paragraph of the question, which, on his present information, seemed to rest on a purely hypothetical assumption.

Mr. Harry Lawson inquired if any steps had actually been taken. Mr. Masterman replied that steps had been taken to see whether the doctors were going to serve in any district under the panel system.

Mr. John Ward asked if the matter could not be decided at once by handing over the money to the approved societies. Mr. Masterman replied that that was a possible alternative. But the first step was to carry out the system laid down in the Act.

Mr. John Ward: We could get it done for half.

Mr. Cooper asked, on November 27th, in view of the fact that Section 15 (2) of the Act established a right on the part of any insured person of selecting the practitioner by whom he desired to be attended, how this could be carried out in the event of a State medical service being set up. Mr. Masterman replied that the right of an insured person to select a practitioner on the panel was conditional upon a panel being set up. If in any area the practitioners on the panel were not such as to secure an adequate medical service, the Commissioners might under Section 15 (2) of the Act make such arrangements as they thought fit for the treatment of insured persons. A State medical service was among the alternatives so open to them, but such a service including many doctors might still offer opportunities of choice by the insured person.

"Visiting" of Persons in Receipt of Medical Benefit.

Mr. Sutton asked the Secretary to the Treasury, on November 26th, whether, in view of the fact that Section 14, Subsection (3), of the National Insurance Act,

1911, provided that Insurance Committees should make rules, *inter alia*, in respect of the visiting of persons in receipt of the benefits administered by them, the cost of such sick visitors and supervision would form part of the costs of medical benefit and the administration thereof which under Section 15, Subsection (6), and Section 61, Subsection (2), of the Act must be paid by approved societies to the Insurance Committees; whether, inasmuch as the Commissioners had also imposed upon approved societies similar duties in respect to the visiting of persons in receipt of the benefits administered by them, the cost of which work would constitute an appreciable item in the administration expenses of approved societies, it was the intention of the Commissioners to make regulations to prevent any unnecessary duplication of this work or to secure that approved societies should not have to pay twice over for their own system of sick visitors and for that of the Insurance Committees; and what steps, if any, the Commissioners proposed to take to secure that no person should be fined, penalized, or deprived of benefits for the same offence under both the rules of his approved society and under any regulations made under Section 14, Subsection (3), of the Act by the Insurance Committee for the county or borough administering the medical benefits. Mr. Masterman said that the Insurance Committees had, under Section 14 (3), the duty of making rules only in respect of benefits administered by them. If the question referred to visiting in connexion with sickness benefit, the rules of the Insurance Committee would apply only to deposit contributors, and no part of the cost, if any, would fall upon the sums provided for medical benefit and its administration. If, however, the question related to the administration of medical benefit, the model rules for its administration issued by the Commissioners for the consideration of Insurance Committees contained no provision for the appointment of visitors by Insurance Committees. A provision was inserted in the model rules to guard against the contingency suggested in the last part of the question.

Income Limit.

Sir Philip Magnus asked, on November 11th, whether a clerk receiving, as salary, less than £160 a year, who supplements it by other remunerative work so that his total income from all sources exceeds £160 a year, must become insured; and, if so, whether he can claim exemption from payment of income tax on the understanding that his income is under £160 a year? Mr. Masterman said that a clerk employed in whole-time service at a rate of remuneration not exceeding £160 a year would be insured as an employed contributor in virtue of that employment irrespective of the amount of any private income or of any remuneration that he might receive for other work. The answer to the second part of the question was in the negative; the liability to be insured did not affect and was not affected by the liability to pay income tax.

The Earl of Ronaldshay asked the Chancellor of the Exchequer, on November 26th, if a man whose income, when joined to that of his wife, exceeded £160 a year was liable to pay income tax upon the joint income; and if that was so, whether a man who was an employed person and whose income, in conjunction with his wife's, exceeded £160 a year, was not entitled to exemption from the provisions of the National Insurance Act. Mr. Masterman replied that the answer to the first part of the question was in the affirmative, subject to the exception under 60 and 61 Vict., c. 24, Section 5, where the husband and wife were each separately earning an income from personal labour and the joint income did not exceed £500. With regard to the second part of the question, he would refer the noble lord to an answer he had given on October 25th. In this answer Mr. Masterman pointed out that the question of insurance in the case of persons employed otherwise than by manual labour depended not on total income, but on rate of remuneration. Where a person employed in whole-time service was remunerated at a rate not exceeding £160 a year, the provisions of the Act applied irrespective of any income which he might derive from other sources. His liability to pay income tax did not affect, and was not affected by, his liability to be insured. Where, however, a person who was employed within the meaning of the Act proved that he was either (*a*) in receipt of a pension or income of the annual value of £26 or upwards not dependent upon his personal exertions, or (*b*) ordinarily and mainly dependent for his livelihood upon some other person, he might claim a certificate of exemption, such certificate relieving him, but not his employer, of the payment of contributions.

Drugs, Medicines, and Appliances.

On November 21st Mr. Masterman informed Mr. Worthington-Evans that he was unable to state whether any Insurance Committees had made provision for the supply of proper and sufficient drugs and medicines and prescribed appliances to insured persons under the National Insurance Act; had yet published a list of the persons and firms who had agreed to supply drugs, medicines, and appliances within its area, or fixed a scale of prices therefor. The Commissioners were communicating with the Insurance Committees on the subject.

Triplets.

In reply to Mr. William Thorne, who, on November 25th, asked a question as to maternity benefit in the case of triplets, Mr. Masterman said that maternity benefit was payable in respect of a confinement, not in respect of the number of children born. In reply to a further question suggesting that some further allowance should be made, Mr. Masterman said that the Commissioners had no power in the matter, however sympathetic they might be. They had to carry out the decisions of Parliament.

Tuberculosis.

Mr. Astor asked, on November 20th, how many insured persons were examined for tuberculosis, and how many were diagnosed as having that disease in the period from July 15th to October 15th, 1912. Mr. Masterman, in reply, said that the Insurance Commissioners were asking the Insurance Committees to furnish a return which would supply the information desired up to date.

In reply to Mr. Astor, Mr. Burns, on November 25th, stated that complete schemes for detecting and treating tuberculosis had been submitted by the councils of 60 counties and county boroughs, and the Board had approved of the main lines of 33 of these. Schemes of a partial or temporary character had been submitted by 46 other such councils, and schemes for the provision of dispensaries had already been submitted by 16 metropolitan borough councils. Approval of such schemes was not withheld longer than was necessary. The total number of beds in the sanatoriums already approved by his department was 2,806; these came up to the requirements laid down by the Local Government Board.

Sanatorium Treatment.

On November 21st Mr. Astor asked the Secretary to the Treasury whether in the event of an insured person entitled to sanatorium benefit being recommended for institutional treatment through the tuberculosis officer in charge of a dispensary, and being sent to a sanatorium or other institution, the fee of 6d. a head now being offered by the Government to medical practitioners would still be paid to that insured person's medical adviser, or would be paid to the institution where he was being treated? Mr. Masterman said that the 6d. referred to was a capitation payment in respect of the treatment of tuberculous insured persons by general medical practitioners. The aggregate amount of these sixpences contributed in respect of all insured persons was to pay for the domiciliary portion of sanatorium benefit, leaving the remainder of the total sum allocated by the Act for such benefit to the institutional treatment.

The Financial Secretary to the Treasury informed Mr. Francis McLaren on November 21st that two applications only had been received from insured persons in the Holland Division of Lincolnshire. Of these one was in so advanced a stage of consumption that he died before he could be removed, and the other was now receiving treatment.

Hospitals and Insured Persons.

Mr. Cooper asked the Chancellor of the Exchequer, on November 27th, what arrangements he had made for insured persons requiring surgical and other treatment which could only be adequately given in hospitals and similar institutions, seeing that insured persons were no longer eligible for hospital treatment as necessitous persons. Sir J. Lonsdale asked if the right hon. gentleman

was aware that it was estimated that of the insured persons who would claim medical benefit after January 15th next at least 30,000 a week would need for their adequate medical treatment hospital provision, and what provision would be made for these persons in the event of their being unable or unwilling to secure treatment in the existing charitable institutions. Mr. Masterman replied that these questions would appear to be based on a misapprehension. Surgical and other cases which could not, consistently with the interests of the patient, be properly undertaken by a practitioner on the panel set up under Section 15, were not affected by the Act, and there would appear to be no reason why such cases should be less eligible in the future than in the past for treatment in hospitals and similar institutions. The average number of in-patients present in the hospitals at any one time would appear to be only a small fraction of the number suggested in the question.

Sir J. Lonsdale further asked if the Secretary to the Treasury was aware that voluntary hospitals had suffered severely owing to the withdrawal of subscriptions, and did he not think it necessary to enter into business arrangements with hospitals for insured persons. Mr. Masterman replied that business arrangements could be entered into between the hospitals and approved societies in the interests of insured persons under the Act. He had no information as to any decrease in voluntary subscriptions to hospitals in consequence of the Act.

Sir C. Kinloch-Cooke asked whether the funds of approved societies would not go down in that case. Mr. Masterman said that the societies would arrange, as some did at present, to contribute a certain amount to the hospitals in return for a certain number of beds being available for their members.

Poor Law Institutions.

Mr. Morrell asked the President of the Local Government Board whether he could give particulars of the draft Order relating to the management of Poor Law institutions, recently been prepared by a Departmental Committee; and whether the House would have an opportunity of discussing the matter before the Order was confirmed. Mr. Burns said that he understood that the Departmental Committee appointed to examine the existing Poor Law Orders with a view to their consolidation and amendment, contemplated drafting an Order dealing with the management of Poor Law institutions, but he had not yet received a report from them on the subject.

Seamen's Records of Sickness.

On November 26th, in reply to Mr. McGhee, the Secretary to the Treasury stated that the Insurance Commissioners were in consultation with the Board of Trade as to the most convenient method whereby the records of sickness required to be kept under the Merchant Shipping Acts may be made available to assist societies in calculating the commencement and duration of the sickess benefit of their members under the National Insurance Act.

Metropolitan Asylums Board.

Mr. Astor asked, on November 25th, how it was proposed to make the hundreds of empty beds in the Metropolitan Asylums Board hospitals available for the institutional treatment of consumptive insured persons in London? Mr. Burns repeated that negotiations were proceeding between the London County Council and the Metropolitan Asylums Board with a view to seeing if it was possible to utilize some of the accommodation. Nothing had been settled, but he understood that the matter was being dealt with as expeditiously as possible.

Mr. Astor asked whether the negotiations began before July 15th, when the sanatorium benefit began? Mr. Burns said he could not say the exact date of the beginning of the negotiations, but he knew for the last week or so both bodies had been doing everything that could be reasonably expected of them to come to an arrangement.

Lord Balcarres inquired if it would not be necessary to have legislation to bring that into force. Mr. Burns replied that it was possible that short of legislation the two bodies could come to an arrangement by which certain beds, or, perhaps, an institution or two, might be released for the purpose.

Medical Service in the Highlands of Scotland.

Mr. Macpherson on November 21st asked whether the Commission appointed to consider the position of the highlands of Scotland with reference to the medical benefits under the National Insurance Act had finished their inquiry; whether their report had now been presented; and if not, when it was likely to be presented? The Marquess of Tullibardine asked if the reference was not with regard to medical services, and not to medical benefits under the Insurance Act? Mr. Masterman replied that he thought the Insurance Act was the reason for appointing the Commission, but the reference was rather larger than with regard to the Insurance Act. He understood that the inquiry referred to was finished, and that the report was now being drafted, and would shortly be presented.

Scottish Universities.—On Thursday last week, and again on Monday and Tuesday this week, the representatives of the Treasury were severely heckled by Mr. Hogge and others on the subject of grants to Scottish universities. The suggestion of the questions was that the Treasury had unwarrantably attempted to interfere with their internal administration, and that in the matter it was under the influence of the Carnegie trustees. The specific suggestions were that this year the Treasury, without consulting the Scottish universities, had imposed the establishment of a uniform and inclusive fee for medical undergraduates as a condition of additional grants; that the Treasury should induce the Carnegie trustees to desist from demanding from applicants for assistance the possession of the Leaving Certificate of the Scottish Education Department, as it was inferior to the preliminary examination held by the universities themselves, and wasted the time of prospective medical students by (among other ways) obliging them to study subjects afterwards useless to them; or alternatively make the Education Department hold examinations for this certificate twice instead of once a year. The replies elicited were to the effect that neither the Treasury nor the Scottish Education Department had anything to do with the Carnegie trustees in this connexion; that the establishment of an inclusive fee of uniform amount was a condition accepted by the Scottish universities several years ago, and that no objection had since been raised; that the rule of the Carnegie trustees in question (which was not absolute) was, in the case of entrants to the universities from secondary schools, usually salutary, and calculated to advance the interests of education. It had not the effect of excluding the most desirable type of student, and even if the final suggestion made were practicable no sufficient reason for adopting it had been adduced.

Cholera.—In reply to Sir H. Carlile, who asked the President of the Local Government Board on November 21st a question as to what special provisions were made for guarding against the risk of the importation of cholera from Turkey, Mr. Lewis said that the regulations of the Local Government Board, dated September 9th, 1907, contained the provisions which were in force for protecting this country against cholera. These regulations were based on the International Convention. Under the regulations the Customs officer was required on the arrival of a ship to ascertain so far as possible whether the ship was an infected ship or had come from an infected port, and to question the captain. If he found that the ship was an infected ship or suspected ship he was required to detain the ship and to inform the sanitary authority.

Sir H. Carlile further asked whether the Local Government Board would consider the urgency of taking special precautions at the present time with reference to this matter? Mr. Lewis replied that the Local Government Board was watching the situation very carefully, and would take all necessary precautions.

Hospitals at Calabar (Native Doctors).—On November 20th, in reply to Mr. Jowett, the Secretary of State for the Colonies said that there was a native and a European hospital at Calabar. They were administered by Government medical officers, but he could not say whether any of the officers in charge at present were natives. The question of allowing private practitioners to take charge of their patients after admission to hospital was under consideration.

England and Wales.

[FROM OUR SPECIAL CORRESPONDENTS.]

LONDON.

Salary of Tuberculosis Officer.

The Lambeth Borough Council recently agreed to establish a tuberculosis dispensary and to appoint a tuberculosis officer at a commencing salary of £300 a year. The scheme was submitted to the Local Government Board, which has addressed a letter to the Council, stating that it approved generally of the outlines of the proposed scheme, but that, having regard to the population of the borough and to the extent and character of the duties of tuberculosis officer, it appeared to the Board to be doubtful whether the proposed commencing salary of £300 per annum would be sufficient to attract medical men possessing the necessary qualifications and experience in the treatment of tuberculosis. Mr. J. McKeith, M.B., C.M., who was recently elected a member of the Council, supported the views of the Local Government Board, and maintained that the Council would not get the services of the best man for such a salary. The Council, however, adhered to its resolution to offer only £300 a year.

St. Andrew's Hospital, Dollis Hill.

On the summit of the plateau known as Dollis Hill, to the north of Cricklewood, and west of Hampstead Heath, an imposing building has sprung up within the last eighteen months. This building is part of St. Andrew's Hospital, a hospital for paying patients chiefly members of the Roman Catholic Church, and more especially of French Catholics. The building as it stands to-day represents but a little more than one-half of the complete structure. The small beginning is to be accounted for on the usual ground—a lack of funds. It may be asked, How comes it that a new hospital is suddenly sprung upon the medical profession; what needs justify its existence, and why has the profession not been taken into confidence until the building is a *fait accompli?* The reply is that a certain lady of means, who desires to be nameless at present, placed a large sum of money at the disposal of Cardinal Bourne, for the purpose of instituting a work of charity. The scheme which was originally put forward could not be adopted for divers reasons, and it was therefore determined that the money thus generously given should be utilized for the above-named purpose. Being in its essence a Roman Catholic institution, the Archbishop of Westminster has decided that the charity shall be devoted chiefly, but not exclusively, to members of that Church, and in accordance with the wishes of the foundress a certain number of the beds are to be used chiefly for French-speaking patients. The advice of Dr. Norman Moore was sought and obtained in matters medical, and a staff has, we understand, already been selected. As the idea was to offer to inmates of the Catholic colleges and convents and young persons, strangers to London, as well as other persons of small means, a hospital where expert medical and nursing attendance could be supplied at a low cost, instead of leaving them between the gratuitous hospital and the expensive nursing home, it was thought that a more elaborate system for medical consultation would not be needed. The hospital is to be under the care of nuns, known as the "Poor Servants of the Mother of God," while the nurses are being trained apparently *ad hoc* at the London Hospital. A chaplain will reside in a separate house within the grounds, and we understand that the management will be vested in trustees, of which the Archbishop is one.

Eventually there will be 100 beds. The right wing and the central part has now been completed, and has room for 63 beds, of which 28 are in two large wards, and 35 in private rooms. The large wards are spacious apartments, with a couple of central ward fireplaces; that on the first floor is divided into two parts by a screen. The lighting is good, the appointments, walls, etc., are of the most modern type, and all the accessory rooms, including bathrooms, w.c.'s, kitchens, etc., are as they should be. The private rooms vary in size, some leading into one another by communicating doors. The cubic space in these rooms is ample—perhaps excessive, if the economic questions be weighed. Every modern convenience is present. In the basement are spacious rooms for fuel, for the heating plant, and for the control of the electric lighting. The kitchens also are in the basement, and the meals will be carried to the wards by electric lifts. On the ground, first, and second floors are apartments designed admirably for every modern hospital purpose. Every corner is rounded off; the flooring throughout the building, save in the hall and chapel, is terrazzo mosaic, the system of ventilation is efficient, the drainage system and the trapping of the gulleys, etc., is hygienic. There are rooms for clinical investigations, for examinations, and for the comfort of the patients. The operation theatre and its dependent rooms are also excellent and modern.

While the architects have been instructed to be lavish in air space for the patients, they have been required to find housing accommodation for too many nuns in a small part of the building. Each cell is of homely appearance, but Liliputian, and the cubic air space scarcely reaches 900 cubic feet. At present some of the larger rooms have been cut off from the main part, and these are to be set aside for an isolation block. The nurses' quarters are a little better, and the Mother Superior and the Nurse Superintendent have good rooms. Above the isolation block there is a flat roof, which is to be used as an exercise ground.

The hospital stands in seven acres of ground, and the situation is good. The site cost £8,000, and the buildings erected up to the present have cost £31,000, and another £1,000 have been expended on making up the road and approach. The estimates involve the expenditure of £20,000 further on the building of the left wing. The total contemplated expenditure is £60,000, or £600 a bed. At present there is a debt of £10,000.

It is anticipated that the hospital will be ready for occupation early in January next, although much still remains to be done in furnishing. The architect of the building is Mr. R. L. Curtis, and the builders are Messrs. Patman and Fotheringham, Limited. Mention should also be made of the provision of motor ambulances for fetching patients from London, among many other convenient arrangements in connexion with the hospital.

London County Council.

Appointment of a Psychologist.

It was reported to the Education Committee of the London County Council on November 27th that thirty-eight applications had been received for the position of psychologist, to be employed as a half-time officer by the Education Department for a period of three years at a salary of £300 a year. After consideration of the qualifications and experience of six candidates interviewed, the General Purposes Subcommittee had come to the conclusion that Mr. C. L. Burt, M.A.Oxon., should be appointed. During the last four years Mr. Burt has held the position of lecturer in experimental psychology and assistant lecturer and demonstrator in physiology in the University of Liverpool.

The Committee approved the appointment of Mr. Burt.

Mentally Defective Children.

At the same meeting the Accommodation and Attendance Subcommittee reported that since the last survey of accommodation for mentally defective children was made in 1910 the number of such children had increased by 795. The increase was probably due to a great extent to the development of the medical inspection of elementary school children. Proposals for the provision of 395 additional places had recently been approved by the Council and the subcommittee submitted proposals for the provision of 430 further places by means of new schools at Hammersmith, Paddington, Hoxton, Bethnal Green, Lewisham, and Deptford. The estimated cost of the proposals on the basis of £40 a place was £17,200 for building only, and in those cases where additional land was required the cost of the necessary sites was estimated at £9,000.

The Committee agreed to the proposed schemes.

Scotland.

[FROM OUR SPECIAL CORRESPONDENTS.]

New Tuberculosis Dispensary Buildings in Edinburgh.

The new tuberculosis dispensary buildings in Edinburgh were opened by Lord Dunedin on November 23rd.

The Secretary read a letter from Professor Edmund Béraneck, of the University of Neuchatel, congratulating Dr. R.W. Philip on the efficient equipment against tuberculosis with which Edinburgh had been endowed through his efforts. A cablegram addressed to Dr. Philip by Dr. Herman Biggs of New York was also read, in which he said, "The dispensary is now everywhere regarded as the keystone of preventive measures."

Lord Dunedin, in some opening remarks, said that even the man in the street had now learnt that consumption was a communicable disease, and that it could be successfully combated in its earlier stages. One of the first men to wake up to the fact was Dr. R. W. Philip, and the communications which had been read showed that his work was appreciated abroad. In concluding, Lord Dunedin referred to the educational side of the work that would be carried on in the dispensary.

Sir Malcolm Morris, K.C.V.O., said that Dr. Philip began his work six years after the discovery of the bacillus of consumption in 1881 by Koch, at a time when there was not a tuberculosis dispensary in Great Britain or any other part of the world. The National Association for the Prevention of Consumption came into existence in 1898, and great good had resulted from the co-operation that now existed between the laity and the medical profession. He did not agree with the view recently expressed that the duty of the State was only to prevent disease, not to try to cure it. If the city or the municipal authority, or the Insurance Commissioners and the municipal authority, would combine to take away altogether, if it were possible, every single advanced case of phthisis and isolate it; if at the same time they assumed absolute control over the milk supply, and if they would make a penal law to stop spitting in covered places, he said emphatically it would only be a question of a reasonable time before tuberculosis as a general infection of mankind would be as dead as the dodo. He was a little nervous about the Insurance Act, because he was somewhat afraid that in connexion with a magnificent organization like this something might come to disturb the *status quo* and do an enormous amount of harm. He would therefore ask those in authority to be very careful before they interfered with this organization. He would ask them further not only not to interfere with it, but to increase its usefulness in every possible way, for in his view it would be much better for all to gain time before they plunged into bricks and mortar and the building of big sanatoriums which after a certain length of time might become perfectly useless.

Sheriff Crawford, in proposing a vote of thanks to Lord Dunedin and Sir Malcolm Morris, said that he hoped that the co-operation that existed in the past between the Corporation of Edinburgh and the Victoria Hospital Committee would be continued between the Hospital and the Insurance Committee.

The Victoria Dispensary commenced operations in 1887 in Bank Street. Four years later it was transferred to larger premises in Lauriston Place, but it has long outgrown the available accommodation. The extensive buildings which formed St. Cuthbert's United Free Church and Hall, in the heart of the districts from which most of the patients come, were acquired and are being adapted to their new purpose.

The tracery has been removed from the large windows on the north elevation and also from those on the south elevation. Steel casements, divided into large panes, have been substituted, and each division of the windows made to open so as to give the fullest natural ventilation to the main waiting-hall. The windows on the side elevations have been enlarged and fitted with double-hung windows.

The buildings include administrative and educational departments. The patients' entrance is from Spital Street. The waiting-hall occupies the space which formerly was the nave. The walls to the underside of the cove below the gallery have been covered with Carrara ware. The aisles have been divided up to form a series of consulting-rooms three on each side, with a male and female dressing-room, and a small dark room for the examination of throats. On the east side is the drug dispensary. The pilasters, cornice, base, and door architraves are of green Carrara ware, the rest of the walls being white. The walls of the consulting-rooms and dressing-rooms are covered with white tiles to a height of 5 ft. from the floor, the tiles being finished off with a green cope and base. The walls of the vestibule are treated similarly to the hall. The waiting-hall is lit by the large north and south windows, and in addition six large lights have been formed in the ceiling. Off the vestibule, on the east side, is an ante-room with a service window for the drug dispensary. Opening off the other side of the vestibule are the patients' lavatories, cleaners' store, and stair leading to the officer's house, which is situated on the first floor.

A broad staircase from the main waiting-room leads to a gallery which extends round three sides of the hall. On the east side are two research laboratories and an *x*-ray room, fitted up with the most modern installations for diagnosis and research. At the north end of the gallery is a room where it is intended to form a consulting library for students and practitioners. Off the west gallery there is a sitting-room for nurses. The remainder of this side is occupied by the officer's house, which has separate access from the outer vestibule.

The entrance for the medical staff is from Lady Lawson Street. Adjoining this entrance is the board-room, statistical department, museum, and a large lecture hall, fitted up so that it can be used for microscopical and cinematographic demonstrations. There is also ample cloak-room accommodation. Access is got from this part of the building to a very large basement below the waiting-hall and consulting-rooms. Part of this has been adapted and can be readily fitted for extension of the laboratory accommodation. The heating chamber is also situated in the basement, with separate access to a lane on the west side of the building.

The floors throughout the building at the street level are of concrete. The concrete is covered with terrazzo finish in the waiting-hall, vestibule, and consulting and dressing-rooms. Wood-block flooring has been used for the drug laboratory. The gallery and library floors are of oak, and the floors of the laboratories are of maple. The cost of the whole is estimated at £8,326. The architects are Messrs. Sydney Mitchell and Wilson.

An Abyssinian Substitute for Tea.

At the opening meeting of the session in Edinburgh of the Pharmaceutical Society of Great Britain, the inaugural address was given by Professor Ralph Stockman, who took as his subject Stimulant narcotics, with a special account of *Catha edulis*. The Swedish botanist, Forskal, who died in Arabia in 1768, was the first to draw the attention of Europeans to the leaves of *Catha edulis* as a stimulant. The plant grows wild in Abyssinia and the neighbouring mountainous districts along the coast of East Africa. Its use is said to be older than that of coffee. The leaves have a pleasant aromatic odour, and an infusion made from them has a markedly sweet and astringent taste, somewhat resembling liquorice. In the social life of the Arabians and Abyssinians the leaves play much the same part as tea, coffee, cocoa, and other well-known stimulant narcotics do among other peoples. Professor Stockman had obtained three alkaloids in a state of purity, to which he gave the names of cathine, cathidine, and cathinine. The first had an action something like a combination of morphine and caffeine. Cathinine had not the same drowsy or depressing effect on the brain, but acted more as a stimulant to the spinal cord. Cathidine acted as a muscle poison and a slight stimulant to the nervous system. Broadly speaking, the action of the leaves was essentially comparable to that of other vegetable products which are used by mankind as stimulant narcotics.

Institutions under the Inebriates Acts.

The eighth report of the Inspector for Scotland under the Inebriates Acts is concerned with the years 1910 and 1911. Since the passing of the Inebriates Act, 1898, ten institutions for the treatment of inebriety have been established in Scotland, four of them being licensed retreats, five certified

inebriate reformatories, and one a State reformatory; this is exclusive of any unlicensed premises there may be. At the end of 1911 seven of these institutions remained open, one retreat and two certified reformatories having been closed. The total accommodation for inebriate patients at the end of 1911 was 161. No new premises for the treatment of inebriety were licensed or certified during 1910 or 1911. The total number of receptions during 1911 was 166—112 males and 54 females—the largest number in any one year since the Inebriates Acts came into force. Of the total number treated, 19 were inmates of certified reformatories, and 12 were in State reformatories, the balance being inmates of private retreats.

The numbers in these certified and State reformatories are markedly less than in the earlier years of these institutions; this points to the conclusion that in Scotland the institutional treatment of the voluntary patient is more frequently resorted to, though at present there is no indication of greater numbers being compulsorily detained in the reformatories.

Greater Glasgow.

The extension of the boundaries of the city of Glasgow and the inclusion within the city of three densely populated burghs will increase considerably the work and responsibilities of the health department of the corporation. The first decision of the new corporation has caused some misgiving. The medical officer of health submitted a scheme with regard to the administrative control of tuberculosis, and, in accordance with that report, the Health Committee recommends that in order to give coherence to the scheme the medical officer of health be formally appointed administrative tuberculosis officer; that Dr. A. MacGregor, assistant to the medical officer of health, who is at present in charge of the work in connexion with tuberculosis, and has a salary of £225, be appointed supervising tuberculosis officer under the medical officer of health at a salary of £500 per annum; that five additional nurses be appointed to be attached to the various dispensaries at salaries of £80 each; that the medical officer of health be authorized to appoint, at salaries of £300 per annum each, three assistant tuberculosis officers to take charge of various dispensaries, the appointments to be made whenever the new dispensaries are in order. It is also proposed that two of the wards in Ruchill Hospital shall be used for a year for the treatment of persons suffering from pulmonary tuberculosis.

At the meeting of the corporation the minute embodying this recommendation was referred back for further consideration of part of it.

School Boards and Medical Certificates.

Difficulties have arisen in Lanarkshire between the school boards and medical practitioners regarding the resolution by the recently formed Monkland Medical Association that its members will grant no medical certificates in case of children detained from school unless the boards pay for these certificates. Certain of the boards insisted on the certificates being on soul and conscience the same as are produced to the court. These boards say that if such certificates are produced to them prosecution of the parents would be unnecessary, otherwise they have no alternative but to bring the parent into court, and he has to bring the doctor at his own expense to substantiate his defence. There were several cases of this nature before Sheriff Lee, who expressed the opinion that parents should be protected from needless expense and trouble. The point was also raised in connexion with several cases of prosecution in the Justice of the Peace Court, a doctor giving evidence for a parent that a child was unfit to attend school, when the case was found not proven. Their Honours pointed out that if the doctor had given a certificate which would have satisfied the school board neither he nor the parent would have had to come to the court.

Lieutenant-Colonel T. R. Macdonald, I.M.S. (Ret.).

In response to a formal request brought to him by a deputation, Dr. T. R. Macdonald, now of Inverness, visited the Island of Skye this month, in order to receive from the representatives of the parish of Snizort and South Snizort an illuminated address in acknowledgement of the services rendered by him to the islanders. The presentation was made at the United Free Church Manse of Snizort, where there was a large gathering, headed by the Rev. D. C. Macdonald, of Kilmuir. In acknowledging the address Lieutenant-Colonel Macdonald said it was not the first visible token of gratitude and goodwill that he had received from the islanders. They had presented to himself and his wife many gifts at the time of his actual departure from the island, and these and the address would be the most cherished of his possessions, and of those of his descendants. They would be valued as coming from the people of the "Isle of Mist," to whom they were proud to belong. Dr. Macdonald was for over twenty years an officer in the Indian Medical Service, and served also in Egypt during the first Egyptian campaign and the subsequent outbreak of cholera. Retiring with the rank of Lieutenant-Colonel, he devoted himself for a considerable number of years to the service of the Island of Skye, taking up work there as resident medical officer of the Gesto Hospital. During his tenure of this office he initiated and successfully carried through a movement which resulted in the provision of a Queen's nurse for Snizort and South Snizort, and in many other medical connexions greatly benefited the island. On finally giving up active medical work he took up residence at Inverness.

Memorial to the late Captain Simson, I.M.S.

An interesting ceremony took place in Edinburgh on November 21st, when the Rev. Dr. Kelman formally handed over to the University Athletic Club a beautiful clock erected in memory of the late Captain E. D. Simson, I.M.S., the University and Scottish International half-back. The clock, which has a single dial, has been erected in a central tower overlooking the balcony of the pavilion. It is the gift of the late Captain Simson's fiancée, Miss Eva Gray, daughter of the late Mr. A. R. Gray, Aberdeen, and bears the following inscription: "Virtute non verbis.—E. B. Simson, Captain, Indian Medical Service, student of Edinburgh University, 1901–1906; born 1882, died 1910." In handing over the clock on behalf of Miss Gray, the Rev. Dr. Kelman said:

"Captain Simpson was first capped in 1902, and played in seventeen international matches. His reckless pluck, unerring sureness, perseverance, tenacity, and resource were the qualities which made him one of the most brilliant Rugby players in the kingdom. In life, as in athletics, he played the game well."

Ireland.

[FROM OUR SPECIAL CORRESPONDENTS.]

The Ulster Medical Society.

The annual dinner of the Ulster Medical Society took place in the Medical Institute, Belfast, on the evening of November 21st. The President (Dr. Leslie) occupied the chair; on his right were Vice-Chancellor Hamilton of Queen's University, and on his left Dr. John Campbell, President of the Ulster Branch of the British Medical Association. The President gave the toast of "The King," which was received with customary warmth. Sir William Whitla then asked permission to speak, although his name was not on the toast list. He said that he often felt that their President should have some badge of office; that the absence of such insignia was a distinct want on more formal occasions. He was wearing at the moment the badge which the profession of Ulster had given him when he was President of the British Medical Association on its visit to Belfast in 1909. If the President and Fellows of the Ulster Medical Society would accept it, he proposed to hand over to them this badge, and he would suggest that living ex-Presidents and each new President should give a link to form a suitable chain, and suitable inscriptions should be made. This speech was received with loud cheers, and Sir William then placed the badge on the President, who returned the most hearty thanks on his own behalf and on that of the society to the donor. Its members knew that the institute and the society had a very dear place in Sir William's heart, and they all appreciated his thoughtfulness and generosity.

Subsequently the toast of "Our Guests" was proposed by Dr. R. J. Johnston, and was responded to by Vice-Chancellor Hamilton and Dr. John Campbell. Mr. Robert

Campbell then proposed the health of the President, who suitably replied, and joined with his own name that of the Honorary Secretary (Dr. Rankin), to whom much credit was due for all his manifold labours and for the success of the evening.

Gift to Royal College of Surgeons.

Last week a lecture was given by Dr. H. Macnaughton-Jones, at the Royal College of Surgeons, Stephen's Green, Dublin, to which the Fellows were invited by the President and Council. A large number accepted the invitation, and were much interested in the account the lecturer gave of the collection of specimens that he has presented to the College. The lecture was illustrated by lantern slides and a microscopical demonstration was given afterwards. The collection consists of miscellaneous specimens, illustrative of various points in surgery, mainly pertaining to gynaecology and diseases of women, and includes several rare examples of pathological conditions. It has been placed in a separate and distinct position in the museum. At the conclusion of the lecture Dr. Conway Dwyer proposed a hearty vote of thanks to Dr. Macnaughton-Jones for his much-valued gift, and for the explanatory lecture of which it was the subject.

Women's National Health Association.

At the last meeting of the Listowel Branch of the Women's National Health Association the Honorary Secretary submitted the report of the district nurse for the three months ending October 31st, 1912, from which it appeared that within that period no fewer than 96 patients had been nursed. The report from the Queen Victoria Jubilee Institute for Nurses was also read; it stated that the work done within the period mentioned was in every respect satisfactory.

Doctor's Superannuation.

Dr. Kilbride (Athy) having recently resigned his position as dispensary doctor, the Athy guardians granted him £117 as a superannuation allowance. The Athy No. 1 District Council last week granted him £7 16s. 8d. superannuation for having acted as medical officer of health for the district.

Special Correspondence.

PARIS.

Compulsory Notification of Tuberculosis.—Committee on Depopulation.—Consumption of Absinthe.—A Chair of "Phthisiology" for Paris University.—Foreign Students and Practitioners in France.

At the request of the Government, the Academy of Medicine has lately been discussing the advisability of rendering compulsory the notification of tuberculosis. Professor Letulle presented a very elaborate report concluding in favour of compulsory notification by the patient's family, or by the landlord, or, as a last resource, by the attending physician, who would deliver his certificate into the hands of the sanitary inspector, thus ensuring secrecy. Disinfection would also be obligatory, and in case of paupers would be carried out by the State. Dr. Letulle's proposals have aroused a veritable storm of opposition in medical circles. In the Academy itself they have met with practically no support after the eloquent condemnation passed on them by Professors Robin and Gaucher. The syndicates of medical practitioners in Paris and in the country have unanimously pronounced themselves against compulsory notification. The opposition, in fact, has been so general and so strong that, without waiting for the Academy's final decision, the Director-General of Public Health has just laid before Parliament a bill stipulating that notification of tuberculosis should be optional, but that in all cases of death from contagious diseases (including tuberculosis) disinfection of the lodging should be compulsory. It is hoped in this way to check to a certain extent the spread of consumption. The bill contains another article by which all strangers coming to reside in France will be compelled to be vaccinated unless they can adduce satisfactory evidence of having recently undergone vaccination.

Not content with the above measures destined to preserve life and health, the Government has once more decided to tackle a problem of paramount importance for the future of France—depopulation. A committee has just been appointed to inquire into the causes of what is really an alarming state of affairs and to propose suitable remedies. It is composed of men who stand high in the different professions (including politics), but it is doubtful whether much good will come of their labours. In the first place they are far too numerous (more than a hundred!) to do much solid work, and then they cannot, of course, alter the average Frenchman's aversion to large families—at least in the thrifty *bourgeois* class.

Consumption and depopulation are not, however, the only plagues that France has to contend with, and alcoholism well deserves to engage the attention and stimulate the best efforts of the Government. Despite the heavy tax established on alcoholic drinks a few years ago, the annual consumption of absinthe (the national appetizer) was 17 millions of litres in 1910 (it was 24 millions in 1900). Such are the statistics just published by the *Revue d'Hygiène*. It is rather interesting to note that whereas other kinds of spirits are much less in vogue in wine-growing counties, absinthe has lost none of its favour: in the Marseilles district the average consumption per head amounts to 2½ litres per annum. But how is the Government to put down the sale of alcohol when the dealers in spirits are among the most influential electoral agents?

And so alcoholism and consumption will go on killing every year the equivalent of a town like Lille in France or Portsmouth in England, despite the best endeavours of the medical profession. The latter has just heard with great interest of the Paris Faculty of Medicine's decision to establish a chair of "Phthisiology." Laboratories are to be erected for it in the gardens of Cochin Hospital with every modern improvement. The new professor, who has not yet been appointed, will be expected to devote his whole time to the problems connected with the pathology, prophylaxis, and treatment of tuberculosis, and it is understood that he is not to engage in private practice. As compensation for this renouncement he is to receive an annual salary of £1,000, which is more than double the amount received hitherto by the highest paid professors in the university.

French medical men have again been airing their grievances against foreign students and doctors at the meeting of the Paris Medical Syndicate held on November 24th. The number of foreign medical students in the French universities has increased very much during the last ten years. In 1900 they numbered 881, against 7,413 Frenchmen; in 1911 they were 1,289 to 7,490. Most of these foreigners hail from Russia; Turkey, Bulgaria, Roumania, and Greece are next in order. A large number of them go in for the competitive examinations leading to the minor hospital appointments. At the last examinations one-fifth of the appointed externes (clinical clerks or dressers) were foreigners; the proportion of foreign internes (resident medical officers) was about the same. The syndicate proposes that the proportion of foreigners admitted to hold the minor hospital appointments should not exceed one-tenth of the number of posts offered for competition. The higher posts will, of course, be reserved for Frenchmen, as is the case now. As for the practitioners, the figures in 1911 were for Paris only as follows: Total number of practitioners, 4,750; foreigners, 355—about 8 per cent. (including 10 British subjects). The syndicate suggests that this proportion be further reduced in the future by admitting as medical students those foreigners only that have passed the *Baccalauréat*—a very stiff examination for those who have not followed the French curriculum of secondary education. This motion practically embodies the law that has been enforced since 1906, and the exceptions have been so very few that it really does not seem that the French doctors have much cause for complaint. This prohibitive policy does not appear to be very wise if the interests of the health resorts be considered. Most British and American patients like to be attended by doctors of their own nationality when abroad, and they may refuse to patronize places where none are to be found.

Correspondence.

ANTIVIVISECTION IN GLASGOW.

Sir,—In Dr. Hadwen's letter under the above heading the following passage occurs: "I have quoted Sir Frederick Treves fairly and squarely, and I repudiate his subsequent assertion that improper use has been made of his statement."

The first part of this sentence embodies an important confession, for it shows that the antivivisectionist's idea of fair and square quotation is to cunningly isolate one particular sentence from its context in order to foist upon it a meaning which it obviously does not bear. The paragraph from my Birmingham address (delivered in 1898), when fairly and squarely quoted, reads as follows:

"Dr. Halsted expresses his conviction 'that there should be a law compelling all surgeons to practise on animals the operations for circular suture of the intestine and for intestinal anastomosis.' I hope this view will not commend itself to the legislators of this country. Many years ago I carried out on the Continent sundry operations upon the intestines of dogs, but such are the differences between the human and the canine bowel that when I came to operate upon man I found that I was much hampered by new experience, that I had everything to unlearn, and that my experiments had done little but unfit me to deal with the human intestine."

The champion of fair and square quotation would add to the above the following from a letter to the *Times* (dated April 18th, 1902), in which I protest against the outrageous methods of the antivivisectionist in connexion with this identical paragraph:

"No one is more keenly aware than I am of the great benefits conferred upon suffering humanity by certain researches carried out by means of vivisection."

With regard to the second part of Dr. Hadwen's statement, it is difficult to speak with moderation. For years the above observation of mine has been used in advertisements, pamphlets, and speeches as affording evidence that I condemn all vivisection experiments as useless. For years I have been so pestered with correspondence on the subject that I have had to keep in hand a supply of reprints of the *Times* letter above alluded to in order that I might deal with this ever-recurring matter with the least inconvenience. The communications I receive are for the most part of two types. Some open with such a sentence as "Is this another antivivisection lie?" while others libel me with the offensive assumption that I am opposed to vivisection, and conclude by asking me to speak at a drawing-room meeting against vivisection or to subscribe to a branch.

I hope that Dr. Hadwen will continue to make his fair and square quotations, for they are very efficient in exposing the pitiable controversial methods of his party, while, on the other hand, they provide the opportunity of sending wholesome literature to the many who seem—even in this enlightened age—to be still in some doubt as to the truth.—I am, etc.,

Kingston-on-Thames, Nov. 24th. FREDERICK TREVES.

AN OPERATION FOR WEBBED FINGERS.

Sir,—In the Journal of last week (pp. 1464–6) Mr. Tubby publishes an article on the treatment of webbed fingers by a special operation which he fully illustrates. I have nothing to say against this operation, for I have never tried it; but I take up my pen in defence of a most simple and successful plan of operating devised by my late friend and colleague, Arthur T. Norton. Mr. Tubby dismisses this with the words, "More elaborate methods have been designed by Norton" and others, but which, according to him, "fail to fulfil the postulates of success." I have done the Norton operation many times, but have never found it "fail to fulfil the postulates of success," and I am of opinion that it will continue to be the operation for the defect when most of the other methods are forgotten. Norton always spoke modestly of his method, but with confidence, and I feel sure that there are many surgeons besides myself who have found it answering all that could be desired of it, even in the worst class of cases.—I am, etc.,

EDMUND OWEN,
Consulting Surgeon to St. Mary's Hospital.

London, W., Nov. 25th.

THE SOIL AND THE SEED IN TUBERCULOSIS.

Sir,—I have been much interested in reading Dr. Halliday Sutherland's article (November 23rd, p. 1434). The subject is important, and in our present zeal to eliminate tuberculosis it may be that we are hardly paying sufficient attention to the matter of the soil. Dr. Halliday Sutherland's data are perhaps hardly sufficient to base safe conclusions upon, but in any case it is difficult to see how they tend to prove that there is no such thing as hereditary predisposition to tuberculosis.

It is suggested that the excess of tuberculosis in the contacts of female cases is due to the close association of mother and child. There is a very good reason, apart altogether from increased opportunity of infection, why we should expect such excess. Female consumptives on the average come of worse stock than male consumptives. There is more tuberculosis in their ancestry. This is not a condition limited to phthisis. We see the same thing in insanity, imbecility, etc. It takes a worse heredity and worse conditions of inheritance to make a female defective than to cause a like defect in the male.

Again, it is suggested that the excess of tuberculosis among the contacts of infectious cases as compared with non-infectious cases is due solely to increased opportunity of infection. Surely, however, the two groups are not comparable?

The non-infectious group may even contain some cases which are not tuberculosis, and, further, the fact of the absence of tubercle bacilli in the sputum would suggest that the disease was milder in these cases on the average, or, in other words, that they had a higher immunity than the infectious group.

Some time ago the writer investigated the family history, obtained on admission, of patients who ultimately died in asylum of tuberculosis. It was found that there was a family history of tuberculosis in such cases much more commonly than in the general run of asylum population. Of course, as demonstrating the inheritance of a predisposition to tuberculosis, one would have been told that such evidence was useless, that such deaths might have been due to a long previous infection from their consumptive relatives.

There is only one way which might appear to offer a satisfactory solution. It has been contended that the elder born, especially the first and second, are specially predisposed to tuberculosis. (If this is not true it is worth disproving, as with the limitation of the family the proportion of elder born in the community is rising rapidly.) Now it might be assumed that this special predisposition of the elder born was due to something in their environment which did not occur in that of the younger members of the family.

But as I think it could be shown that there was again an increased predisposition to tuberculosis in offspring born of mothers who were becoming old, one could not have it both ways, and it might settle the argument.—I am, etc.,

Clifton, York, Nov. 23rd. D. W. HUNTER.

Sir,—In the current number of the Journal Dr. Halliday Sutherland publishes an interesting statistical contribution to our knowledge of tuberculosis. Assuming the validity of Dr. Sutherland's data, which I do not propose to discuss, it appears to me that the fifth conclusion on p. 1437 is a *non sequitur*. The utmost Dr. Sutherland is entitled to conclude is that among the *children of consumptives* those exposed to special risks of infection *and* peculiarly unfavourable environmental conditions exhibit a higher proportion of actually consumptive persons than those not so exposed. No inference whatever can be drawn as to the cause of the difference, if any, between the percentages of tuberculous offspring in the families of consumptive and non-consumptive persons, since no data respecting the latter are provided. There is a substantive experiment, but no control experiment. Dr. Sutherland cannot even draw any conclusion as to the relative importance of the enhanced opportunities of infection on the one hand and the influence of an unfavourable home environment (due to the incapacity of a parent) on the other. I do not suppose that the most fanatical supporter of the doctrine of inherited predisposition imagines that to the children of consumptive parents the environment is a matter of

indifference, and I suggest that the problem of inheritance is hardly one to be disposed of in this summary fashion.—I am, etc.,

Statistical Laboratory, Lister Institute of Preventive Medicine, Nov. 25th. M. Greenwood, Jun.

TUBERCULOUS INFECTION IN INFANCY AND CHILDHOOD.

Sir,—The paper by Dr. Paget Lapage was a valuable contribution to the important subject of tuberculosis in children. It may be mentioned, however, that though the evidence afforded by *x*-ray examination in the main supports the teachings of morbid anatomy, there are, in a few minor details, reasons for doubting the evidence to be conclusive.

One of these arises in connexion with abnormal conditions noticed at the apex of the lungs. My experience in the *post-mortem* room would lead me to say that it would be a great mistake to assume that because some defect is noticed near the apex of a lung that the defect is tuberculous.

With regard to the debated question of the frequency of tuberculosis of the lungs in children, I have always maintained that the *post-mortem* room shows the disease in a chronic form to be rare. I have also held that the majority of chronic affections of the lungs in children prove to be non-tuberculous. This applies not only to morbid conditions at the base of the lung, but also at the apex. Bronchopneumonia—especially, it seems to me, the bronchopneumonia of measles—frequently leaves behind dilatation of the bronchial tubes, and this dilatation not only may be as marked in an upper as in a lower lobe, but may be limited to an upper lobe. The majority of observers would probably consider a chronic affection of the lung limited to an upper lobe to be undoubtedly tuberculous. This I believe to be very far from the truth.

There is one other point which is of great importance: The *x* rays may detect something abnormal at the root of a lung; but what is the nature of this abnormal condition? Is the abnormal condition, assuming it to be tuberculous, still a source of danger? As the child grows older the risk of infection through the bronchial glands becomes less. At what age does the tuberculosis of the bronchial gland in most instances become quiescent?

This is one of the points upon which I consider that further information from the *post-mortem* room is required. Caseous bronchial glands, although possibly not quite so common as the *x* rays would lead us to believe, are sufficiently common to merit careful investigation. And not only does the life-history of these glands—if I may so express it—need to be carefully traced out, but there is great need for more definite information concerning the origin and termination of all chronic affections of the lungs in children, whether tuberculous or non-tuberculous.—I am, etc.,

Sidcup, Nov. 19th. Theodore Fisher.

INSANITY AS A GROUND FOR DIVORCE.

Sir,—The "arguments in favour of insanity as a ground for divorce" call for serious consideration from the profession.

1 and 2. Granted the possibility of divorce (*a vinculo*), the arguments are unanswerable. It is to be remembered that, although "the institution of divorce proceedings is perfectly voluntary," the possibility of that institution alters the relation between the parties to a marriage (just as the relation between brother and sister-in-law is altered by the possibility of "marriage" with a deceased wife's sister).

3 deals with the avoidance of the alternative between "enforced celibacy" and "irregular unions," and must be read with 5 (time limit as a test of incurability). As a practical fact, is not the first year of enforced celibacy the most difficult time?

4 deals with comparison of insanity with other incurable diseases, and concludes thus: "The whole world would condemn a man who divorced his wife for paralysis or consumption." I submit (1) that an increasing proportion of that "whole world" with its growing terror of consumption as a contagious disease and with the increasing "confinement and isolation in a" sanatorium of consumptives, will soon abandon this condemnation. (2) That the ground of "avoidance of enforced celibacy" will become quite naturally extended to cases of malignant and other disease of the genital organs, of paralysis involving the sphincters, or other conditions prohibiting normal marital relations.

6 deals with an alleged hardship where insanity is caused by the conduct of the sane spouse. This allegation cannot logically be expected to receive consideration if the avoidance of an alternative between "enforced celibacy" and "irregular unions" is the guiding principle. The opponents of divorce do not deny the existence of "hardships" (or suffering).

7 deals with the alleged aggravation of the condition of the insane spouse by the knowledge that insanity constitutes a ground for divorce. I invite comment on the two following cases:

A, a lawyer, aged 83, suffered from post-influenzal psychasthenia, with insomnia, depression, dread of insanity and possible suicide. He is now 84, well and clear-headed, and in active practice again. Could he have stood the added strain of the knowledge of a possible divorce?

B., the wife of a medical man, aged 35, had a similar condition lasting over twelve months, with constant dread of becoming definitely insane. She has since had another child and presented no return of mental symptoms throughout and is in good health now. Could she have stood the added strain of the possibility of divorce?

8 deals with the alleged comfort derived by the insane from visits by the sane spouse. I have not the necessary experience to deny that all insane persons who, for the safety of the community and themselves, are confined in an asylum are "so far mindless as to have lost all affection and to be incapable of deriving enjoyment from the visits of friends"; but is it true?

As men we must hold that divorce *a vinculo* is either possible or impossible (I hold the latter); but as a profession, asked for advice on technical points by a section of the community who hold it to be possible and desirable, we must carefully weigh the evidence concerned with those technical matters upon which we are qualified to give an opinion carrying weight.—I am, etc.,

St. Columb, Nov. 18th. J. R. R. Trist.

MODERN FRENCH VIEWS ON NEPHRITIS AND URAEMIA.

Sir,—In connexion with the discussion on nephritis at the Annual Meeting of the British Medical Association, reported in the Journal of November 9th, I crave permission to relate as briefly as possible the results of Professor Widal's investigations on nephritis and uraemia. They lead to an accurate diagnosis and prognosis of renal disease, and place the therapeutics of the same on a scientific basis. Widal's views are now followed by most of the French physicians, but they do not seem as yet to have met with sufficient recognition at the hands of the medical profession in England. This is my excuse for venturing to call attention to them.

By the work of its glomeruli and the elective action of its tubular epithelium the kidney normally insures the excretion of certain substances conveyed by the blood. This selection bears not only on the nature of the molecules that traverse the gland but also on the number of molecules to be eliminated. The disturbances of this complex function give rise to the symptoms met with in renal disease. Anatomical findings cannot always account for them, nor can etiological considerations. Hence the necessity of placing on a physiological basis any inquiry into the pathogenesis of renal manifestations.

Up to a very recent date the disturbances which generally mark the terminal stages of nephritis were grouped under one same heading—namely, "uraemia." They were considered to be the result of functional inadequacy of the kidney, leading to retention in the system of toxic products normally eliminated by the renal epithelium. As to the nature of those poisons and their corresponding clinical manifestations, there was much uncertainty. Widal has shown that in practice it is possible to recognize two essential kinds of retention—that of sodium chloride and that of urea. These two forms may be met with separately or in combination, but each gives rise to well-defined symptoms, easily recognizable, whatever the nature and cause of the nephritis or the morbid changes found in the kidney.

The cardinal sign of sodium chloride retention (chloraemia) is oedema, peripheral and visceral. When this

appears in the course of nephritis, it is certain that there is relative but well-marked impairment of the renal excretion in regard to salt, and salt is the only substance that gives rise to oedema when retained in the system. Peripheral oedema can be seen; visceral oedema can be easily suspected when a rapid decrease takes place in a patient placed on a dechloridized diet. To this form belong most of the symptoms hitherto described as the respiratory and nervous manifestations of uraemia, hydrothorax double or unilateral (then most often on the right side), oedema of the lung (so-called albuminuric bronchitis), headache, eclampsia, coma, Cheyne-Stokes breathing. To these symptoms may be added vomiting and diarrhoea, the fluids thus eliminated containing a high proportion of salt. All these disturbances rapidly improve and disappear under the influence of a salt-free diet; they do not recur when the patient is placed on a diet containing an amount of salt proportionate with the excretory power of the kidney in regard to that substance.*

Very different is the clinical picture of urea retention etymologically (the only true uraemia). In this form the digestive disturbances generally occupy the front rank, and there is no oedema unless there be concomitant chloridaemia. The patient complains of loss of appetite, amounting to positive loathing for any kind of food. Attempts at feeding give rise to severe and obstinate vomiting. Ulcerations in the mouth and bowel are not infrequent, the latter giving rise to bloody stools. Drowsiness, gradually deepening into coma, is a common manifestation of urea retention. Pruritus, anaemia, and pericarditis are not uncommonly met with; the appearance of retinitis must be considered as of grave import.

Whereas chloridaemia is not in itself fatal if proper treatment be applied (salt-free diet and theobromine), urea retention is always a grave condition. According to the amount of urea found in the blood, it is possible to foretell, fairly accurately, the probable date of death. Normally the blood serum contains from 0.15 to 0.50 grams of urea per litre. In true uraemia this amount may rise to 4, 5, and even 7 grams. From Widal's observations, which extend over a period of ten years, the following rule may be drawn: If the amount of urea per litre is 1 to 2 grams, the patient will probably die within the year; if from 2 to 3 grams are found, the chances are that he has but a few weeks to live. The end is near when the amount exceeds 3 grams. It is therefore most important to estimate the amount of urea in the blood in all cases of chronic nephritis, in order to detect true uremia in its incipient stage, when suitable dietetic measures may still be of some avail, and later to gauge the patient's prospects.†

Such are the two essential forms of renal inadequacy that sooner or later appear in nephritis. They are as a rule preceded by a condition, more or less chronic, that may be marked simply by albuminuria (with or without casts and blood cells), or by the syndrome of high arterial pressure with slight albuminuria, headache, vertigo, cramps, numbness, etc.; accentuated aortic second sound with gallop rhythm. In this latter form accidents are to be feared such as profuse epistaxis, acute oedema of the lungs, haematuria, retinal haemorrhage, and, above all, meningeal or cerebral haemorrhage; or dilatation of the heart may supervene, and the clinical picture is then that of a cardiac case, the purely renal symptoms being thrust into the background.

Considerations of space prevent me from entering more fully into details of pathological physiology, technique, and treatment. I must be content with this elementary exposition of the four major urinary syndromes.

(*a*) The purely albuminuric syndrome.
(*b*) The syndrome of high arterial pressure.
(*c*) The syndrome of sodium chloride retention (chloridaemia).
(*d*) The syndrome of urea retention (true uraemia).

The physician should bear in mind that these different syndromes may be interwoven sooner or later in a higher or lesser degree, but they can be always recognized clinically and with the aid of the analytical chemist. Their knowledge is of the highest importance in regard to the estimation of the functional activity of the kidney, and to the prognosis and treatment of renal disease.—I am, etc.,

Paris, Nov. 24th. CHARLES G. JARVIS.

* The excretory power of the kidney in regard to salt can be measured by comparing the amount of salt taken in the food with the amount of salt passed in the urine during corresponding periods. The test must be kept up for a week or so, and the final results only should be taken into account. The simplest and most accurate method is to place the patient on a rigid milk diet; it is then easy to calculate the amount of salt taken, since 1 litre of milk contains 1.60 gram of salt.

† In true uraemia the patient should be placed on a very low proteid diet, consisting chiefly of fat and carbohydrates.

THE TREATMENT OF NEURASTHENIA.

SIR,—I hasten to reply to Dr. G. Vigers Worthington's letter. He asks for some explanation of my letter of October 14th. I have re-read it, and to any ordinary intellect it seems to me quite intelligible; but if he will let us know what special difficulty he has, I will try to remove it if I can. He says he is anxiously awaiting my prescriptions to enable him to cure neurasthenia, although I distinctly said in my letter that such cases must be under my own personal supervision, since it was the "will" that was awanting in the patient, which the doctor must supply. Perhaps that is his difficulty in my letter of October 14th, because he says he could keep his patients under his own personal supervision, and ensure obedience. I feel sure he has never tried to do so, and he could not ensure obedience unless he had his patient under lock and key. He wishes to see my reply to Dr. Branson's letter, in which he asks me to answer three questions; but I hope both he and Dr. Branson will now comprehend how useless it would be for me to answer his questions. Both of these gentlemen, as well as the crowd of correspondents my letter attracted—themselves victims of neurasthenia—remind me of my patients, when I began practice at Manchester, who seemed to think my account ought to vary directly with the number of bottles of medicine I gave them, for I had to dispense my own drugs, as I believe is generally still the practice of the general practitioner in England. I managed, however, to educate my patients, and when they appreciated the paramount importance of good advice, they were less anxious about the bottle. All of us are more or less like my English patients, in need of education in dietetics.

The little I have learnt has opened my eyes to the miraculous power of a knowledge of the physiological action of food in the treatment of every disease, and, having discovered how imperfect my education had been at the University of Edinburgh, I gave a course of lectures in Edinburgh two years ago on "Dietetics, or the Science of Human Life," hoping medical students would attend and learn what I had to teach, which would save them from neurasthenia, which I now regard as synonymous with disease. That same year, at an inter-university congress at Glasgow, a medical student proposed a motion to the effect that their teachers ought to be asked to teach dietetics. The motion was lost by a majority of one, because to pass such a motion would be dictating to their teachers. The following year, however, at the same congress, when it was held in Edinburgh, that motion was passed unanimously, but I have never yet heard that a chair, or even a lectureship of dietetics, has been originated at any of our medical schools. Now, however, that there is such a desire on the part of members of the Association for information as to diet in the cure of neurasthenia, I hope the Representative Body, in spite of its other business, may find time to discuss the question of appointing a committee to collect *facts* as to the treatment of disease without any drugs. I shall be glad to assist in any way I can, and if the Committee for Collective Investigation was resuscitated and this subject properly gone into, we would soon be able to cure any curable disease in a week, without even spa treatment at Llandrindod or any other wells.—I am, etc.,

Hawick, Nov. 23rd. JOHN HADDON, M.D.

RE-EDUCATION OF THE ATTENTIVE CONTROL.

SIR,—I was greatly interested in Dr. Miller's paper on re-education of the attentive control (JOURNAL, November 23rd, p. 1459), but on coming to the proposed exercises at the end of the paper I was reminded of the schoolmaster who said he had known boys spend more time in learning to read backwards than would have sufficed to conquer the minutiae of the Latin or Greek grammar.

A doctor once took a gentleman who was suffering from

intense melancholia for a country ramble; during the course of the walk the doctor, by example after example, interested his patient in the structure of plants and the habits of insects, and gave a lesson or two in geology. To the doctor's delight, and possibly to his astonishment, he found that by the time they had returned to the house again he had converted a suicidal melancholiac into an enthusiastic natural scientist, and from that time the patient pursued the study with such avidity that in the course of years he became an authority on the subject, and never again suffered from melancholia. One trembles to think what might have happened in this case had it not been for the skilful intuition or the fortunate insight of his medical attendant.

Any one who has ever taken an intelligent interest in the study of mathematics will know something of the old pleasure, something of the old enthusiasm, by devoting a few minutes every day to the solution of mathematical problems, and this is a study which makes for absolute accuracy, and accuracy is one of the objects of the re-education of the attentive control.

In my opinion the mental strain involved in learning to recognize words by listening to any one spell backwards would be far in excess of that required to acquire a language, and without either the pleasure or utility of such acquisition.

The pursuit of some useful knowledge would give a sense of added power, and a renewed sense of power would increase self-confidence, and self-confidence is what is lacking in many of the cases described by Dr. Miller.

But to give a patient any occupation which would carry with it either pleasure or enthusiasm looks like running away from Huxley's definition of the object of true education—to acquire the power to do something every day which one would rather not do. I contend that in the pursuit of almost any branch of useful knowledge sufficient difficulty will be met with to acquire enough of this power for all practical purposes; but to spend hours in striking out a given vowel from a newspaper column is, in my opinion, a degrading occupation, a waste of energy, and, whatever it may do in educating the attentive control, it cannot increase the patient's respect for himself, and, what is worse still, must remind him of his malady every time he resumes so hopeless a task.—I am, etc.,

Liverpool, Nov. 25th. W. Bramwell, M.D.

THE TRANSITORY BIGEMINAL PULSE.

Sir,—Sir Lauder Brunton's article appearing in the Journal of October 19th suggests that the bigeminal pulse is due to a secondary cardiac rhythm, possibly of nerve origin.

The existence of such a rhythm is indicated by a considerable body of indirect evidence. In the rabbit, cat, and horse a nerve is present in the neck which runs up from the heart to join the vagus. Experimental observation shows that this nerve is in communication with cardio-inhibitory and vaso-inhibitory centres, and it has been further ascertained that the nerve exercises its function when under the stimulus of hypertension of cardiac muscle. This branch of the vagus receives the name of "the depressor nerve."

The depressor nerve, then, exercises its function when in presence of peripheral resistance, and thus becomes the instrument for the fulfilment of Marey's law which runs in these words: "The beat-rate of the heart is in inverse ratio with arterial pressure." Moreover, from experimental observation we know that beat-rate is increased when the vagi are cut, and slowed when they are stimulated. Whether the beat-rate be quick or slow, the time occupied by the systolic period of the cardiac cycle is constant. On the other hand, when the pulse is slow the diastolic period is prolonged, when it is rapid this period is curtailed.

From these observations it is obvious that the vagus is instrumental in controlling the beat-rate of the heart, and that its influence, modified by the quality of systole, is exercised in the diastolic period. This action of the vagus involves periodicity, and may therefore be described as rhythmical, the rhythm consisting of negative waves.

In the dual curve, which represents the bigeminal pulse, it is noticed that the diastolic period of the primary wave is short, while that of the secondary is long. This sequence of events—namely, a small wave succeeded by a large one—is a matter of common observation in rhythmical processes, consequently the occurrence of a weak wave in the vagal negative rhythm at any time may produce the phenomenon known as the bigeminal pulse.

In the normal radial tracing synchronized for comparison with apex and jugular curves, the dicrotic wave is noticed to start precisely at the same point of time as diastole begins. There are reasons which make it probable that the dicrotic wave is modified by depressor action. The connexion existing between the depressor nerve and the vaso-inhibitory centre has already been mentioned. It is also a matter of frequent observation that in neurotic subjects, while nerve centres are presumed to be highly impressionable, the dicrotic notch descends to the basic low pressure line, and the proportions of the dicrotic wave are considerably amplified. On more than one occasion I have noticed the normal radial curve assume a pronounced dicrotic form in the course of a single tracing.

That a vagal negative rhythm operating through the depressor nerve makes its influence felt in heart and arteries is not an improbable conjecture.—I am, etc.,

Streatham, S.W., Oct. 21st. H. Walter Verdon.

HOSPITAL ABUSE.

Sir,—May I venture to call attention to a very serious subject requiring immediate action—namely, the proposed rebuilding of the Chelsea Hospital for Women? From what can be gathered it is to be reconstituted on a large scale on the same old bad lines of administration which have been over and over condemned for the last twenty years, and by nearly every metropolitan hospital still persisted in.

As regards in-patients there are two classes of persons. Those who can contribute are received into this hospital on condition that they pay half a guinea or more weekly. The income from this source last year averaged 5s. a week. Therefore more than half were admitted without payment. For this second class, who are unable to pay, there is already provision made in the workhouse infirmary, to which all are obliged to contribute. It has been suggested that the infirmary should be available for those under the Insurance Act and their dependants. Consulting surgeons might operate there as well as in other—the voluntary—hospitals. I hope that in time the infirmary may be open to consulting surgeons who might hold clinics there two or three days a week. The Chelsea Hospital would then be free to accommodate patients who prefer to pay but cannot afford the charges of private nursing homes.

The out-patient question is the most urgent. The new department is to be "thoroughly up to date and useful for treating patients." "Plenty of room." I am told that a shilling is now charged from patients. That shilling should go into the pocket of the doctor in the patients' own neighbourhood. A man who has been a few years in practice surely knows as much about common diseases as any senior student just qualified.

If the out-patient department be kept purely for consultations and for those sent up by general practitioners, the practitioner should be able to be present, or to get the consultant's opinion—if he wants it. At present, if a patient is admitted to any hospital, it is the exception for the man in attendance to know anything more of him or her. Consulting staffs are greatly wanting in courtesy. However, as regards the rebuilding, evidently the crowds who throng these waiting-rooms would be much diminished. Many of these applicants will be under the Insurance Act.—I am, etc.,

London, S.W., Oct. 21st. George Crichton, M.D.

PRACTICE IN IRELAND.

Sir,—Your special correspondent in Ireland drew attention in a recent issue of the Journal to the action of the Swinford Board of Guardians, who have drawn up a scale of fees for private practice which candidates for public appointments in their district must accept, otherwise there is no chance of appointment. Surely the profession is strong enough to resist such terms!

It is bad enough to be "bossed" by publicans, small

farmers, shopkeepers, etc., who know nothing about qualifications of candidates, and often care little about the poor; but it is the last straw if we are going to let them arrange our private fees. Will they give a guarantee that there will be no bad debts?

The election of doctors in Ireland for public appointments certainly requires to be altered. It is ridiculous to say that a man is appointed because he is a friend of "so-and-so," is a native of the county, is a good fellow, quite disregarding his qualifications, age, experience, etc. Canvassing is allowable, and rigidly carried out, for nearly all appointments. This should certainly be prohibited, as it is generally in England. There are places at present in Ireland where a chief tuberculosis medical officer will some day be appointed. The salary is hardly yet fixed, the appointment has not been advertised, and yet doctors have long since canvassed all those who have a vote, and doubtless most votes are already promised. So after the advertisement appears, if a doctor with special practical experience in the treatment of tuberculosis applies, will he be appointed—will he have a chance? I think not.—I am, etc.,

November 11th. MEDICAL PRACTITIONER.

ASSISTANT MEDICAL OFFICERS IN ASYLUMS.

SIR,—A great and increasing difficulty is being found in obtaining candidates for the above positions, and at the present time, when so much attention is being devoted to the reasonable emoluments and just aspirations of the profession, a word or two on the conditions of the service may not be out of place.

The initial salary is good in most instances, averaging for a beginner £150 to £200 a year, with full board and lodging. Candidates are, however, beginning to find out that beyond this there is little else. In a service without any system of promotion except luck and what is known as "ability to pull the strings" able men find themselves in receipt of £250 to £300 a year after twelve, fifteen, and more years' service, living in two rooms, or perhaps sharing a sitting-room with a younger colleague, and bound hand and foot night and day to the institution, with little or no hope of advancement, and doing little more than marking time. It might seem reasonable to say they should leave and try something else, but the fact is many of them feel that, burdened as they have been for many years by routine duties that have no relation to medicine, they are ill adapted to return again to a pursuit requiring great initiative and much knowledge that in their case is rusty or forgotten. For one reason or another surgical work of any importance in most asylums is delegated to an outsider, and medical treatment in many cases carried out with a somewhat jealous eye on what is known as the "general maintenance rate." Leave generally consists of about two afternoons and perhaps evenings a week, unless some unusual circumstance stands in the way. All the rest of the time the assistant medical officer is at the disposal of the authorities. He is unable to establish a home, and his situation and the nature of his immediate surroundings precludes much social intercourse. He is under many restraints and has many distasteful duties. The latter must necessarily exist, but many of the former could, in the opinion of many of us, be usefully relaxed. Where the night work usually resolves itself into the mere giving of a hypnotic, or a short routine visit to the wards, it is not surely necessary to keep six or eight men on duty. A proportion of them could do their day's work and finish, say, at 6 or 7 p.m, and leave, with the superintendent's approval, their junior colleagues to fulfil any simple task that may fall to them after this. It would enable the senior men that wished to do so to marry, and to all it would give a much-needed sense of some relief from onerous and harassing conditions of life. As a result a much greater selection of candidates would present themselves for any vacancy that occurred, and much better work than is sometimes done now could be reasonably expected. Most subordinate members of the lay staff have these and other privileges, and why they should be totally denied to the entire medical staff below the superintendent is a mystery, and very injurious to the service.—I am, etc.,

November 17th. ASSISTANT MEDICAL OFFICER.

A PARASITIC MOULD OF THE HOUSE-FLY.

SIR,—The importance of the house-fly as a factor in the spread of disease is becoming daily more important.

One of the many methods that have been proposed for their destruction is the use of a parasitic mould, *Empusa muscae*, to the ravages of which house-flies succumb in large numbers in the autumn. This mould has hitherto resisted all attempts at cultivation, and recently a question was asked in Parliament about it.

It may therefore be of interest to your readers to know that the artificial cultivation of what appears to be this pathogenic fungus may be carried out, direct from the fly, in liquid horse serum three months old, from which it can be subcultured on to blood agar. The cultures in each case were incubated at 37° C.

A blood agar tube covered with the mould thus grown was sent by me to Mr. M. Massee, of the Royal Gardens, Kew, who is an expert in this class of organism. He kindly examined the growth and expressed the opinion that it was an *Empusa muscae*, the morphological characters of which had been modified by growth on artificial media.—I am, etc.,

H. DE RIEMER MORGAN.

The Lister Institute, Elstree, Herts, Nov. 27th.

STREET NOISES.

SIR,—You were good enough last September to grant me space in your columns to invite the support of the profession in approaching the authorities with a view to mitigating street noises. I have now to thank you very much for that favour, and to express my gratitude to those medical men who were kind enough to communicate with me. You and they will, no doubt, be pleased to learn that the authorities, following my representation, have issued an order prescribing the use of silencers for motor cycles after March 31st next, and have informed me that borough or county councils are empowered under Section 23, Municipal Corporation Act, 1882; Section 16, Local Government Act, 1888; and Section 5, London Government Act, 1899, to make by-laws dealing with the other noises complained of.—I am, etc.,

CHAS. MONK,
Lieut.-Col. I.M.S. (retired).

Burlton Lodge, Station Road, Barnes, S.W.,
Nov. 25th, 1912.

DOCTORS AND THE MANUFACTURE OF DRUNKARDS.

SIR,—As the executive of the National British Women's Temperance Association, we desire in rejoinder to your leaderette of August 3rd, entitled "Doctors and the Manufacture of Drunkards," to offer you our assurance that the appeal issued by our association to the medical profession on this subject was not intended by us to raise or perpetuate a charge against the profession, but, on the contrary, to assist in dissipating any justification still remaining for such charge.

Being already, but too fully, aware of the unreliability of evidence given by inebriates, to which you direct our attention, we desire to state that we issued our appeal to the profession, not upon the statements of these unfortunates alone, but also upon the past personal experience of many of our own members in regard to the prescription of alcohol in sickness or debility. It is, therefore, with the greatest satisfaction that we welcome the assurance of your JOURNAL that the medical profession is at this time as fully alive to the importance of temperance on the well-being of the people as are the members of our own temperance association, and we desire to thank you for the help and encouragement thus given us in the work for the community which we are now endeavouring to press forward with all the means, however inadequate, in our power, and which will be materially assisted by your endorsement of our views.—On behalf of the executive, I am, etc.,

47, Victoria Street, Westminster, S.W., Oct. 23rd. AGNES E. SLACK, Acting Vice-President.

NEW DRUGS.

SIR,—Professor Dixon's statement before the Parliamentary Committee on Patent Medicines, to the effect that no useful drug had been introduced except by a man

who had a laboratory, is about as amusing and as true as if he had stated that every man who had a laboratory produced a new drug.

I myself am responsible for the introduction of two new drugs, namely, calcium iodide and calcium permanganate, which appear to-day on every drug list issued, and are extensively used, although I have no laboratory and am but a general practitioner.—I am, etc.,

Swansea, Nov. 12th. G. ARBOUR STEPHENS.

Universities and Colleges.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

ANNUAL MEETING OF FELLOWS AND MEMBERS.

SIR RICKMAN J. GODLEE presided at the annual meeting of Fellows and Members on Thursday, November 21st, at 3 p.m.

President's Address.

In presenting the Annual Report of the Council (see BRITISH MEDICAL JOURNAL, November 9th, 1912, pp. 1346-7), he referred to the loss which the College had sustained by the death of its Vice-President, Mr. Clinton T. Dent, and stated that the vacancy thus caused had been filled by the election of Mr. Edmund Owen to be a Vice-President. In reference to and continuation of the paragraph dealing with the National Insurance Act, he referred to four resolutions passed by the Joint Committee of Colleges and Universities in England (see BRITISH MEDICAL JOURNAL SUPPLEMENT, November 16th, 1912, p. 551). It was felt that it would be inadvisable at the present juncture to take any further action in regard to the attitude of the members of the staffs of hospitals towards the working of the Act.

After dealing with a few points contained in the report, he gave some details in regard to the financial aspect of the removal from the old examination hall to the new hall in Queen Square. The College of Surgeons had received as its share of the proceeds of the sale of the old hall the sum of £24,500. The freehold site of the new hall cost the College £11,600, and its share of the cost of building was £11,700. A sum of £700 still to be paid for equipment brought the total to £24,000. The amount remaining from the purchase money and a little more would be required for incidental expenses. On the other hand, they now possessed a freehold examination hall, as against one with a ground rent of £2,200 per annum, and the assessment of the new premises was only £1,800, as against £6,000 on the Embankment. A considerable economy in rates and taxes was thus effected.

Questions.

Mr. Sidney C. Lawrence asked a number of questions, to which the President replied.

National Insurance Act.

Mr. H. Nelson Hardy moved the following resolution:

> That this meeting of Fellows and Members approves and endorses the action of the Council taken during the past year in reference to the National Insurance Act, and agreeing with the Council's statement in its letter to the Insurance Commissioners dated February 1st that the administration of medical benefits cannot be carried out under the Act, as it at present stands, with due regard to the interests of the public and the welfare of the medical profession, trusts that in the coming year nothing will deter the Council from discharging its duty to its Fellows and Members as firmly and as faithfully as it has done in the year that is past.

The action of the Council in refusing to attend the conference suggested by the Chancellor of the Exchequer was, he said, very greatly to the advantage of the Fellows and Members, and was the most important action in their interests which had been taken in the forty-five years during which he had been attached to the College. The Council had been publicly scolded by Mr. Lloyd George; its members were told that they were unfit for their positions, and that the lowest strike committee in the land would not have acted as badly as they had done. The Council's deliberate opinion that the medical benefit could not be administered under the Act as it stood with advantage to the public and to the profession, and that no satisfactory arrangement could be arrived at without an amending Act, had been ignored. The British Medical Association had made a fine attempt to come to terms with Mr. Lloyd George, but after a long and painful struggle had given it up in despair. Another effort had, it was true, been made recently, but an overwhelming majority of the members had refused to take service under the Act and Regulations, on the ground that they were unworkable and derogatory to the profession. Mr. Lloyd George's last speech had shown how little importance could be attached to the varying moods of such a versatile Minister of the Crown. After dealing with various details, Mr. Hardy turned to the action of the conference with the hospital staffs, and asked for information as to the number of members who had signed the British Medical Association pledge. In conclusion, he stated that a direct resolution asking for an amending Act would carry great weight in the House of Commons.

Mr. E. B. Turner seconded the resolution. He agreed with all that Mr. Nelson Hardy had said, save that the British Medical Association had thrown the matter up in despair. After briefly referring to the deliberations of the Representative Meeting, he remarked that the action of the Council of the College in regard to this matter had assisted the profession in their fight. It had produced a great effect on the profession and on the public. The Association had felt grave anxiety in regard to the attitude which the consultants might take up, and here again the action of the College had been of great value, more especially in reference to the out-patients' departments of hospitals. He was delighted to feel that there was no material difference of opinion in the profession, and that the two great portions would fight together against a common foe. He urged that the money question had weighed least of all with the members of the Representative Body.

Sir Victor Horsley dealt with the question of remuneration under the Act, and pointed out that this was a very important matter, for if the Members placed themselves on a low level, the public would value them at the price they put on their services. He considered that the British Medical Association alone had fought this fight, and therefore honour should be given where honour was due.

Mr. Day having pointed out that the Act was a tentative one, on a three years' trial,

Dr. W. G. Dickinson moved as an amendment the deletion of all the words after "Insurance Act," and the addition of the words "as far as it goes." Mr. Lawrence seconded.

Mr. George Jones did not think that it would be advisable for the meeting to commit itself more than was necessary. He did not believe that Mr. Lloyd George had intended to interfere with the medical profession, and if he had interfered it was unintentionally. He compared the effect with that of the Education Act of 1870, and prophesied that in the course of the next forty years the profession would find out that the Act had improved its position. The amendment, on being put, was carried by 20 to 13, and was confirmed as a substantive motion.

Direct Representation.

Sir Victor Horsley moved the following resolution:

> That this twenty-eighth annual meeting of Fellows and Members again affirms the desirability of admitting Members to direct representation on the Council which, as now constituted, only represents those Members who also hold the Fellowship; and that it does so in order that the constitution of the Council of the Royal College of Surgeons of England shall be in keeping with modern ideas of true representation.

In moving his resolution, he said that the question of the fitness or unfitness of the Members of this College to govern their own affairs had been raised year by year, but the Council had always ignored the demands made for a true explanation of their conduct. The Members were qualified, both by knowledge and financially, to vote in the governing and management of the College. The Council had always held that the Members were unfit either to vote at the elections of members of the Council or to sit on the Council itself. Why did the Council consider the Members unfit? The members of the Council, he was sorry to say, had always treated the annual meeting with scant courtesy. No member of the Council had deigned to reply to their demands since 1910. The speaker then referred to the incident of 1907 and to the utterly futile report of that year. He sketched the history of this struggle, and said that the action of the Council in this matter was very reprehensible. After mentioning the terms of the reply given by Sir Henry Morris (whom he hoped to have seen at the meeting) in 1910, and which failed entirely to explain the situation, he referred to the memorial which the Society of Members had sent to the Prime Minister, and which was recorded in the report of 1907. He was trying to gather information as to what was passing in the minds of the members of Council. The methods adopted

would not serve to advance the interests of the College, but would undermine their position. The Council had sent a reply to the Privy Council on this subject of the questions raised in the memorial, and had further sent a deputation to prejudice the position in the minds of the Privy Council. Why could the members of the Council not state openly what reason existed for the refusal to admit the Members of the College into the Council? They had been told that if one or two representatives of the Members were admitted, they would probably ask for more seats. It was a monstrous thing to say, as had been said, that direct representation of the profession had proved a failure in the General Medical Council, and that this formed a reason why the College should not adopt it. It was further urged that the frequent discussion of socio-political subjects would alienate the present class of member of the Council were Members of the College admitted, and that within a short time these gentlemen would decline to sit in Council at all. (Laughter and "hear, hear" from the body of the room.) The Council had failed to give one valid or proper reason why it assumed this attitude. He claimed it as a right that a reply should now be given as to the real reason of this. The College was neither one thing nor another. It was neither the mediaeval guild which it was in 1435, nor was it a modern type of surgical institute. In the mediaeval guild every member of the craft had a word to say in the management of affairs. He proceeded to give what he described as a not literal summary of the regulations of the Guild, and concluded by a challenge to the Council to advance the best reason they could summon for considering the Members of the College unfit to participate in the management of their College.

Dr. Josiah Oldfield, in seconding the motion, said he had a high opinion and great respect for the professional capabilities of the members of Council, and for their knowledge of surgery, but it was one thing to be a good surgeon and another to be a good legislator. It was not necessary that the distinguished surgeon should possess that degree of common sense which was required in the management of affairs. The impregnable position in which the Council enveloped themselves was a subversion of ordinary government, and unjust. He supposed that the Members would be given the same answers that they had received year by year. He asked the President what he imagined would happen if Mr. Lloyd George could assume the same impregnable position as they had assumed. If he, like the Council, were protected by an unassailable fortress, instead of having to face the public to secure his seat in Parliament, where would the profession be in their fight for fair treatment? He maintained that a fight against the Council of the College was iniquitous. The Members contributed over £10,000 to the funds of the College, while the Fellows only brought in some £3,000. What was the ground for disenfranchisement?

Sir Alfred Pearce Gould took up Sir Victor Horsley's challenge, and denied that the Council considered the Members unfit to sit with them. The reason why they did not agree to admit Members into the Council was because the Council of the College was not a legislative body. The matters with which it had more especially to concern itself were the care of the most valuable museum of its kind in the world, the care of a library which deserved the high reputation it held, and the inspection and conduct of what he maintained were the most important and the finest examinations in surgery. He did not think that the Council would be better qualified to deal with these matters if Members were elected on it. The next reason was that an election in which all the Members of the College, who were scattered all over the world, took part, would be very costly, difficult, and, he thought, impracticable. In matters affecting the profession, the Members had the British Medical Association, which had proved itself to be admirably fitted to safeguard the interests of members of the profession.

Mr. Fitzgerald remarked that while Sir Alfred Pearce Gould had disclaimed the suggestion that the Members were unfit for representation on the Council, he had proceeded to give reasons why they could not be considered fit to look after the Hunterian Museum and the library.

Mr. J. Smith agreed with Sir Victor Horsley; and Dr. Dennis Vinrace maintained that, in spite of Sir Alfred Pearce Gould's contention, the Council were legislators. Mr. Roche also spoke.

Sir Victor Horsley, in reply, said that he was disappointed with the result of the discussion. On the point of constitution there had been a marked failure. Only one speech had been given by members of the Council, and while he had a high regard for Sir Alfred Pearce Gould, who was a teacher of his, he maintained that his points had not been met. They had been told that the Members could not help in the work of the College. That was not the case. They still did not know why the Council considered the Members unfit to sit on the Council. The arguments advanced were no answer to the question, and were quite unworthy of a deliberative and scientific body. He had expected a reply from the President, but it was now too late, since he had been called upon to reply. The President had failed in his duty, and had not given the Members what in courtesy and justice they should have received. He would not have an opportunity of remedying this omission until next year.

The motion was then put and carried.

National Insurance Act.

At this point the Members began to leave the theatre, and Dr. W. G. Dickinson moved the following:

> That this meeting regrets that the Council has not called a special general meeting of Fellows and Members to consider the National Insurance Act.

Mr. Sidney C. Lawrence seconded, and the President attempted to put the motion. A few Members voted for it, no one voted against, and the President declared the motion carried.

Vote of Thanks.

A vote of thanks to the President was moved by a Member, and was acknowledged by the President.

VOTES FOR MEMBERS.

Dr. Josiah Oldfield writes with reference to the remarks of Sir Alfred Pearce Gould:

As seconder of the resolution asking for "votes for Members" and "seats upon the Council," I venture to point out that Sir Alfred Pearce Gould's arguments are never likely to satisfy that intelligent body of Members who consider that—since there are over 17,000 Members, who contribute over £10,000 a year to the College, while there are only some 1,500 Fellows who contribute under £3,500 a year—the sole government and administration and voting powers should not remain in the exclusive possession of the Fellows, but that Members also should have a voice in the spending of the money which they so largely contribute.

In short reply to Sir Alfred Pearce Gould I would maintain that surely a selected M.R.C.S. would be as capable of an opinion upon the Hunterian Museum as any F.R.C.S.! The Fellows had also seized the exclusive powers before the Hunterian Museum existed.

As to the library, it seems monstrous to suggest that because a man is not an F.R.C.S. he cannot help to administer a medical library.

As to examinations, since the majority of candidates are for M.R.C.S. examination it is surely a strong argument that men holding the M.R.C.S. diploma should be represented upon the body which settles the examination as to the number of members; one would have thought that Sir Alfred Pearce Gould would have been proud of them instead of bewailing them. It seems to me a most inconsequent argument, since it runs—You Members are so many and we Fellows are so few, *therefore* you shall have no voice and we will have all the voice.

The reply to the argument that holders of the M.R.C.S. diploma are scattered all over the world is that holders of the F.R.C.S. diploma are equally widely scattered. The final argument of cost is surely an unworthy one to throw at those who provide the largest of the funds of the College. And really the cost is comparatively trivial. My own society took the opinion of every M.R.C.S. throughout the world on the question of women's admission to the examinations of the College!

I venture to hope, therefore, that every M.R.C.S. will now join "the Society of Members of the Royal College of Surgeons of England" and stand shoulder to shoulder in the demand for an alteration of the Charter of the College if the Council persists in refusing any voice to the 17,000 Members of it.

Dr. W. G. Dickinson (Portishead) also writes:

I was very glad to hear Sir Alfred Pearce Gould's reply to Sir Victor Horsley on the question as to why Members of this College are not represented on the Council.

Sir Alfred Pearce Gould is such an eminently fair and reasonable controversialist that it is a pleasure to listen to him, and we may be certain that he said everything that can be said from the point of view of the Council on this matter.

I should like to be allowed to reply that the Council is already elected in the same way as most other bodies of a similar nature, but by a very limited electorate—namely, some 1,500 Fellows—and that the proposal is only to extend the franchise to the larger number of Members. It is also proposed that the Members should only have a restricted representation on the Council, say some half-dozen seats, and that the remaining twenty-four should be elected as at present by the Fellows. Sir Alfred Pearce Gould cannot reasonably maintain that the discharge of the present limited functions of the Council would be in any way interfered with by the presence of Members, who are just as much interested in the welfare of the College as the Fellows.

We know, however, from other sources, such as the reply of the Council to the Privy Council, when this question was raised some years ago, that the College Council fears that the Members will introduce discussions on matters of socio-political interest which will disturb the lethargic calm in which that body is at present enwrapped. As to this, I will only say that nothing of the kind is to be expected. We do, however, claim that the College has another function which it persistently keeps in the background—namely, to look after the interests of its Fellows and Members. It does not even pretend to do this, and the presence of Members on the Council might induce an awakening to its duties in this respect. It had an opportunity of doing this in connexion with the Insurance Act, but instead, it only (in conjunction with other bodies) called a meeting of the staffs of London hospitals.

The statement that it is impossible to poll 17,000 Members can only be characterized as preposterous. It has been done already several times by the Society of Members, and would be quite easy for the College with its much larger resources.

In conclusion, I would only assert that the addition of a few Members would be a source of strength instead of weakness to the Council, and would put an end to an irritating domestic controversy which has existed at the College for over a quarter of a century.

FELLOWSHIP.

The following candidates have been approved at the examinations indicated:

FIRST FELLOWSHIP.—F. J. Anderson, A. R. Bearn, B. Biggar, M. W. K. Bird, E. C. Bradford, J. C. Brash, S. E. V. Brown, G. C. Chubb, P. S. Foster, V. Gabriel, J. B. Haycraft, S. H. Hodges, R. T. Jones, S. W. M. Jones, R. A. Kerr, A. A. Lees, A. S. Liebson, G. C. Linder, M. W. B. Oliver, A. C. Perry, D. D. Pinnock, E. D. Pullon, J. B. Stanley, J. O. Thomas, J. W. Tonks, D. Watson.

UNIVERSITY OF OXFORD.

The following have been appointed as examiners for medical degrees: *Organic Chemistry*, Dr. F. D. Chattaway; *Pharmacology*, Dr. W. E. Dixon; *Human Anatomy*, Professor Arthur Thomson; *Human Physiology*, Dr. W. Ramsden; *Pathology*, Dr. H. M. Turnbull; *Forensic Medicine, Hygiene, and Public Health*, Dr. F. J. Smith; *Medicine*, Dr. Theodore D. Acland; *Surgery*, Mr. George Heaton; *Obstetrics*, Dr. H. Russell Andrews.

UNIVERSITY OF CAMBRIDGE.

THE following degrees have been conferred:

M.C.—A. H. Crook.
M.B.—A. H. Crook, B. A. Ployne, J. Winterbotham.
B.C.—B. A. Playne, J. Winterbotham.

UNIVERSITY OF LONDON.

THE following candidates have been approved at the examinations indicated:

THIRD M.B. (*All Subjects*).—*C. M. Jones (*a*), Westminster Hospital; *C. J Marshall (*a, b, c, University Medal*), Charing Cross Hospital; *J. Taylor (*a*), University College Hospital; C. Aldis, W. M. Ash, C. A. Birts, Florence H. Bousfield, R. Brewitt-Taylor, B. W. Brown, B. I. Cohen, T. P. Cole, Gertrude Dearnley, L. A. Dingley, H. T. Evans, W. B. Foley, J. M. Foord, G. E. Genge-Andrews, W. S. George, A. J. Gibson, C. Gibson, C. D. Grange, F. W. Hamilton, A. W. Hansell, A. W. Havard, B. W. Howell, A. H. Hudson, G. W. B. James, Mary S. Jevons, M. M. Khan, J. S. H. Lewis, R. H. Liscombe, Dorothy C. Logan, Emily C. Macirone, P. J. Monaghan, J. F. O'Connell, H. W. Parrott, P. T. Patel, Sara L. Penny, F. H. Rees, J. F. G. Richards, W. G. Rogers, E. G. Saunders, W. F. V. Simpson, H. K. V. Soltau, J. L. Stewart, J. Tattersall, F. R. Todd, E. A. Wilson.

Group I.—G. F. Bradley, J. M. Curé, A. L. Fitzmaurice, F. R. Fletcher, W. M. Glenister, J. M. Joly, T. P. Kilner, G. S. Miller, H. M. Rashbrook, W. Robinson, Margaret E. E. Smith, Mary A. van Ingen.

Group II.—J. Appleyard, E. Bach, A. C. L. Bilderbeck, A. B. Cardew, F. W. T. Clemens, M. J. Cronin, G. R. Dobrashian, A. R. Elliott, D. M. Gibson, R. L. Horton, F. H. Kelly, J. D. Lyle, G. R. Lynch, C. L. Pattison, W. B. Sanders, A. R. Sharrod, A. W. Venables, E. W. Wade, N. T. Whitehead, A. Wilson.

B.S.—F. C. McCombie.

* Awarded Honours.
(*a*) Distinguished in Medicine.
(*b*) Distinguished in Pathology.
(*c*) Distinguished in Forensic Medicine.

UNIVERSITY OF EDINBURGH.

Scholarships.

THE following awards for the session 1912-13 have been announced: The *Crichton Research Scholarship* in Physiology, Mr. J. A. Campbell; the corresponding scholarships in Pathology, Messrs. N. H. Bolton and D. M. Lyon; the *Sibbald Scholarship* and *Grierson Bursary* in first professional subjects, Messrs. J. Milne and J. Bennett; the *Grierson Scholarship* in Pathology, Mr. A. H. D. Smith; the *Grierson Bursary* in Materia Medica, Mr. T. Pullar; the *Crichton* and *Thomson Bursaries* in preliminary examination subjects, Messrs. G. W. Dunlop, L. Mackinnin, and J. Thompson; the *Neil Arnot Prize* in Natural Philosophy, Mr. J. Brown.

APOTHECARIES' HALL OF IRELAND.

THE following candidates have completed the examinations indicated:

INTERMEDIATE.—F. Duckworth, J. B. Barry, M. B. Kennedy.
FINAL.—S. Ram Rao, A. S. Dillon.

SOCIETY OF APOTHECARIES OF LONDON.

THE following candidates have been approved in the subjects indicated:

SURGERY.—*†T. J. Gibson, *†J. W. Harrison, *†G. R. Lynch.
MEDICINE.—*†H. E. B. Finkelson, †T. J. Gibson, W. C. Himely, †W. S. Hyde, *E. M. Morris.
FORENSIC MEDICINE.—M. P. Dos Santos, A. M. L. Greaves, T. H. W. Idris, E. M. Morris.
MIDWIFERY.—G. R. Lynch, E. M. Morris, S. Zarchi.
* Section I. † Section II.

The diploma of the Society has been granted to Messrs. T. J. Gibson and W. C. Himely.

Medico-Legal.

O'SULLIVAN *v.* BRITISH MEDICAL ASSOCIATION.

THIS case was heard by the Lord Chief Justice and a special jury on November 22nd. A claim was made by Dr. Patrick Joseph O'Sullivan to recover damages from the British Medical Association for a libel said to have been contained in the BRITISH MEDICAL JOURNAL of October 7th, 1911. The defence justified the statements made so far as they consisted of allegations of fact. It was also alleged that the remainder of the article was fair comment upon matters of public interest.

The plaintiff appeared in person. Mr. A. Neilson (instructed by Messrs. Hempson) represented the Association.

The plaintiff, in opening his case, read the statement of claim to the jury. He said that at the date of the publication of the article of which he complained he was practising at 69, Queen's Road, Dalston, and was a candidate for the post of medical officer to the Shoreditch Guardians, and for the post of medical superintendent of the Homerton Infirmary, Hackney.

The Lord Chief Justice: What do you say is libellous, Mr. O'Sullivan?—I say the whole article is libellous, but I object particularly to the last part. Continuing, the plaintiff said that in September, 1911, he heard of this vacancy at Shoreditch. When he first applied for the post there was a disagreement between the guardians, and he was not appointed.

The plaintiff then entered the witness-box and said that he was M.D., Q.U.I. (1875). He had been assistant to a Dr. Ambrose at Dalston from May, 1911. His first application for the post of medical officer to the Shoreditch Guardians was rejected on September 27th. The article complained of then appeared. He complained of the expression: "Every man for himself and Dr. O'Sullivan for us all." There was profanity in it, and it was calculated to bring him into contempt. The part he most objected to was the passage which conveyed that he was a disgrace to his native land and to those with whom he had been associated in the army and at sea. The congratulation was something he also objected to.

In cross-examination, witness said that this was an appointment for the third division of Shoreditch. There had been a vacancy since before December, 1910. He had not heard that the payment was regarded as low. He did not then know that the defendant Association had made representations on the subject to the Local Government Board. He knew that there was a dispute before he applied for the vacancy, but he did not know that the guardians had received a letter from the Local Government Board.

Mr. Neilson: Did you know at that time that there had been a dispute between the profession and the guardians?—I knew there was a dispute, but did not know the details.

Continuing, witness said the guardians offered £110. He did not know that no doctor could be found to accept the post at £115. It was true that the guardians then raised the salary to £150. He did not know when he applied that the profession thought £150 too low. It was true that two out of three candidates withdrew their application on representations made by the medical profession. Dr. Ambrose knew about the dispute. He (witness) was not elected at that meeting, but he was elected for a year on October 25th. There were no other candidates, and he had been re-elected this year.

Dr. Alban Dixon, on being called as a witness, objected to give evidence on the ground that he had not been paid.

The Lord Chief Justice: You have come here, so I am afraid I can do nothing.

In the course of his evidence he said that prior to the appointment of the plaintiff he had been doing temporary duty. He sent a list of the cases he had been dealing with to the clerk to the guardians when he gave up work. He denied that he was bound to give details of the cases to the plaintiff as a matter of professional etiquette.

The Lord Chief Justice: This does not appear to help the plaintiff's case.

Continuing, witness said he saw the article a month after it appeared.

In cross-examination, he said he was going to apply for the post, but was warned by the Association. He was paid at the rate of £600 a year for his temporary work.

Dr. Henry Edward Garrett, a medical officer to the Shoreditch Guardians, said he saw the article at the time it appeared. He had not the honour of the plaintiff's acquaintance. He had never been introduced to him. The first time he spoke to him was on the night before last.

The Plaintiff: I am most anxious to make the acquaintance of the medical officers. They avoid me!

In cross-examination, witness said the dispute between

the guardians and the profession had existed long before the article appeared.

This concluded the plaintiff's case.

Mr. Neilson then submitted on behalf of the defendants that the plaintiff had shown no cause of action.

The Lord Chief Justice accordingly inquired whether the jury desired to hear anything further.

Mr. Neilson intimated that he had witnesses to call if the jury desired to hear them.

The foreman said they were agreed that it was only fair comment.

Judgement was therefore entered for the defendants with costs.

AN ACTION FOR FEES.

On November 19th the Lord Chief Justice, sitting with a special jury, heard the case of Duke *v.* Wilson and others, in which Dr. Benjamin Duke, of Windmill House, Clapham Common, sought to recover £600 14s., being fees for medical attendance on the late Mr. Edward Henry Brown, of Roehampton, and his family. The defendants alleged that the plaintiff charged a guinea a visit when he was only entitled to charge 10s. 6d. They also said that he had attended unnecessarily and unreasonably.

Mr. Walker, K.C., and Mr. Macnaughton appeared for the plaintiff; Mr. Gregory, K.C., and Mr. Watson for the defendants.

It appeared that the plaintiff had known the deceased for twenty years. In 1887 deceased went to Roehampton, a distance of five miles from Clapham. Consequently plaintiff always charged a guinea for each visit, and two guineas for a consultation. The fees were paid punctually down to 1909. In 1910 Mr. Brown suffered from dyspepsia, heart trouble, and carcinoma of the tongue. Sir Jonathan Hutchinson and Sir Douglas Powell both saw him. An operation was proposed, but abandoned owing to the condition of the patient's heart. He died on October 7th, 1911. The plaintiff did not send in the 1910 account as usual because of his patient's illness, but he did send it in June, 1911, by special request, when it amounted to £485. When the son and daughter objected to his charges in August of that year, he said that if they thought so he would discontinue his visits. Mr. Brown, however, still wanted him to attend. Altogether he had travelled about 5,000 miles to see Mr. Brown, and had spent some £250 on cabs.

Sir James Goodhart gave evidence to the effect that daily attendances were necessary.

A witness, called for the defence, said that when the bill for £485 was shown to Mr. Brown he had said it was too much, but that the (his) children might settle it after he had gone. The son of the deceased admitted that he had written to the plaintiff thanking him for his kindness and care of his father.

In addressing the jury for the defence, Mr. Gregory suggested that a guinea was an exorbitant fee for a general practitioner. Moreover, in this case, the deceased could not be cured, he could only be watched.

The Lord Chief Justice said that no evidence had been called by the defendants to show that the guinea fee was excessive. The charge that the plaintiff had attended unnecessarily in order to make money was a serious one to make against a medical man, and ought never to have been made without evidence, and it was to Mr. Gregory's credit that no mention of it had been made by him. It was a remarkable thing that the defendants had been unable to bring forward medical evidence to support their case.

The jury returned a verdict for the plaintiff for the amount claimed, and judgement was entered accordingly.

TREATMENT OF SCHOOL CHILDREN IN SCOTLAND.

A case of importance to school boards was argued by counsel in the Court of Session in Edinburgh on November 15th. The case was presented by the School Board of Glasgow on the one hand and Miss Allan, a ratepayer, on the other. The cases of two school children are cited. These children required dental treatment, but their parents were unable on account of poverty to provide the required treatment. The school board proposed to pay for the treatment out of the school fund, but was threatened with an action by Miss Allan, who contended that the school board had no power to do what it proposed. The effect of such payment by the board would be to throw the cost of the treatment upon the school rate. The board maintained that it was entitled to provide and pay out of the school fund the appropriate medical or dental treatment required in such cases either (*a*) by providing the necessary apparatus and medical staff at one or more schools or other places, or (*b*) by sending the children to be treated by competent private practitioners, or at hospitals or infirmaries, and that at all events it was entitled to do so in cases where the parent was unable on account of poverty or ill health to provide the necessary medical or dental treatment.

After hearing counsel, the court made avizandum.

AGREEMENTS.

A legal agreement must have the terms thereof plainly stated, must be signed by the parties to it, and duly witnessed and stamped. It is usually in duplicate, each of the parties having a copy bearing the signature of the party with whom he contracts. The agreement quoted by our correspondent appears to be in order, but it should bear a sixpenny stamp.

The Services.

INDIA.

Cantonment Regulations.

The British Committee of the International Abolition Federation has published in a pamphlet bearing the title, *Our Army in India and the Regulation of Vice*, the correspondence between it and the India Office on the rules, regulations, and practice in Indian cantonments with regard to prostitution and disease. The correspondence extends from October, 1909, to October, 1912. The pamphlet contains a reprint of Lord Kitchener's memorandum for soldiers in India (for insertion in the soldier's small book) and also of his memorandum on steps for the prevention of venereal disease. In the introduction, the committee states that the pamphlet has been issued in response to many requests for an answer to the question whether and to what extent, and in what manner, the State regulation of vice is still in force in Indian cantonments. As a general indication of the attitude of the committee we may quote one paragraph from this introduction:

> The existing conditions in India are defended on the ground of "practical results." But before attributing the marked and continuous decrease in venereal disease among the European troops in India to the effect of the 1897 rules, it should be borne in mind that in the Home Army a similar marked and continuous diminution of disease began immediately after the repeal of the Contagious Diseases Acts, and has continued without the aid of any of the practices to which we object. If the improvement in India is due to "sanitary control" of brothels, to what is it due in England? A reply to this question may be found in the official report on the health of the army in India for the year 1909, where the decrease is not attributed to the operation of the rules, but to a different set of factors, most of which operate equally in the two armies. As noted in former reports the steady annual decrease in these diseases may be ascribed to a variety of causes, chief among which are the personal influence of the commanding officers, the spread of temperance, the variety of games and amusements which fill up the spare time, the more thorough treatment of disease, by which relapses are checked, and finally the deterrent influence of the loss of service pay which those who contract these complaints have to suffer. It is from such influences as these that further improvement is to be expected, and to such influences the official toleration of brothels must be a hindrance rather than a help.

Indian Medical Service.

The Government of India has sanctioned the introduction of "Organization, Administration and Equipment" as a subject in the examination of lieutenants of the Indian Medical Service for promotion to the rank of captain. This sanction will have effect from January 1st, 1914, to embrace all lieutenants whose commissions are dated January 28th, 1911, and those of any earlier batch who have not by that date completed their departmental examination for promotion. It has also been decided that lieutenants of the Indian Medical Service may be allowed to appear for their promotion examination on completion of one year's service.

Obituary.

We regret to record the death, on November 16th, of Dr. George Forbes, of South Shore, Blackpool, in his 52nd year. It took place at Leeds after an operation undertaken for the relief of a condition from which Dr. Forbes had for some time been suffering. An Aberdeenshire man by birth, Dr. Forbes received his general education at Aberdeen Grammar School, and his professional education at the medical school of the university of the same city. After graduating M.B., C.M., in 1886, he practised for nine or ten years in Oldham; he then moved to Blackpool, where for the past fifteen years he had been a well-known figure and a highly esteemed personality. An old member of the British Medical Association, he was on the staff of the Victoria Hospital, and at one time was president of the Fylde Medical Society. He was a successful practitioner, possessing apart from his marked professional abilities a very happy power of inspiring confidence in his patients. A bright-eyed, square-built man, with regular features, he had one manner for all classes, and his geniality and many sterling qualities had endeared him to a host of friends. By instinct he was an outdoor man, but he was one of the pleasantest of companions everywhere. Dr. Forbes was married, and is survived by his wife and two daughters, with whom much sympathy is felt.

DEPUTY SURGEON-GENERAL ALEXANDER MORRISON DALLAS, Bengal Medical Service (retired), died at Ealing on November 9th. He was born on July 5th, 1830, educated at Guy's Hospital, took the M.R.C.S. in 1855, and entered the Indian Medical Service as assistant surgeon on February 20th, 1856; becoming surgeon on February 20th, 1866; surgeon-major July 1st, 1873; brigade surgeon on December 1st, 1882; and reached the administrative grade as deputy surgeon-general on September 9th, 1884. Owing to ill health he was unable to put in the full term of five years in that rank, and retired on April 2nd, 1889. He was decorated with the C.I.E. on May 29th, 1886. He was serving in India at the time of the Mutiny but the Army List credits him with no war service. Most of his career was spent in civil employment in the Punjab. He entered the Gaol Department in that province in 1859, became Inspector-General of Gaols in 1863, and held that post for over twenty years, until promoted to administrative rank, when he became Surgeon-General of the Punjab. In the following year, 1885, the local rank and title of surgeon general was withdrawn from the deputy surgeon-generals at the head of the provincial civil medical administrations, and that of Inspector-General of Civil Hospitals substituted.

Public Health AND POOR LAW MEDICAL SERVICES.

ESTIMATES OF POPULATION.

DR. J. LLEWELYN PRICHARD (Medical Officer of Health, Aberdare) writes: In the SUPPLEMENT of the JOURNAL of November 9th the estimated population of Aberdare is given as 51,819. Taking the 1911 census population as 50,844 and 1901 as 43,365, I should very much like to know how you arrive at this result.

*** The estimated population of Aberdare in the middle of 1912 (51,819) is that estimated and published by the Registrar-General. The method of estimating post-censal populations is explained in the Registrar-General's last annual report, and the "factors" used for different towns for 1911, 1912, and 1913 are quoted. Thus, for Aberdare the inter-censal increase (7,465) is multiplied by the factor .13242746 and the product is added to the 1911 census population.

$$50{,}830 + (7{,}465 \times .13242746) = 51{,}819.$$

Medical News.

AN International Congress of Marine Hygiene will be held at Genoa in 1914.

DR. EDMOND RYAN, of Crumlin, Mon., has been appointed to the Commission of the Peace for the county of Monmouth.

DR. FRANCIS J. H. COUTTS (Kingston Hill), Dr. Thomas F. Pearse (Calcutta), Dr. Hugh Stott (Lewes), and Sir John Tweedy (London), have been elected Fellows of the Royal Sanitary Institute.

EARL FORTESCUE (Lord Lieutenant of the county of Devonshire) has consented to accept the office of President of the twenty-eighth congress of the Royal Sanitary Institute, to be held at Exeter from July 7th to 12th, 1913.

UNDER the will of the late Miss Elizabeth Stringer of St. Leonard's, Liverpool Royal Infirmary receives a bequest of £2,000; and the Convalescent Home for Women and Children, New Brighton, and the Hastings and St. Leonard's Hospital, £1,000 each.

SIR J. COCKBURN, M.D., K.C.M.G., Dr. R. J. Maitland Coffin, Major R.A.M.C. (T.F.), one of the honorary medical officers, and Dr. R. W. Henderson, a member of the Testing Subcommittee, have been elected members of the new council of the British Fire Prevention Committee.

FOR the consideration of the general meeting shortly to be held in Glasgow the directors of the Scottish Burial Reform and Cremation Society have issued their annual report. It shows that the prejudice against cremation is steadily, if slowly, being overcome. During the year ending September 30th, 1912, forty-four cremations were carried out in Scotland, compared with thirty five in the previous year, making a total since the opening of the crematorium in Glasgow of 402. It may be mentioned that a special crypt for the reception of urns has just been erected in St. Columba's, the leading Presbyterian church in London.

AT the meeting of the Royal Society on December 5th, Dr. J. S. Haldane and his colleagues Dr. C. G. Douglas, Mr. Henderson, and Mr. Schneider will report the results of their physiological observations made on Pike's Peak, Colorado, with special reference to adaptation to low barometric pressures. A series of papers by various workers on processes operative in solutions, all communicated by Dr. H. E. Armstrong, will also be read.

A SELECT Committee of the House of Commons was appointed on November 27th to inquire into the circumstances which had led to the large and increasing number of fatal accidents in the metropolis due to motor omnibuses and other forms of power-driven vehicles, and to make recommendations as to the measures to be taken to secure greater safety in the streets. The Committee consists of Mr. A. Baker, Mr. Shirley Benn, Mr. Boyle, Mr. Stephen Collins, Mr. Goldsmith, Mr. W. Guinness, Mr. Harris, Mr. Kellaway, the Earl of Kerry, Mr. Morison, Mr. Munro, Mr. Nolan, Mr. W. Thorne, Lord A. Thynne, and Sir G. Toulmin.

BUTTERWORTH'S, a firm of publishers familiar to many generations of lawyers, is now turning some of its energies into medical directions. It has for some years had branches in India and Australia, and these are now to deal with medical books upon an extensive scale. The first catalogue issued by them contains the titles of many hundred modern works both by foreign and British authors, which will be promptly obtainable from the Calcutta and Sydney branches at the same prices as in this country. All medical men resident in these countries will, at their desire, be furnished at regular intervals with the names of books added to the list.

THE monthly bulletin for October of the Office Internationale d'Hygiène Publique contains a summary of deaths from certain diseases and groups of diseases in France, Germany, England and Wales, Belgium, Holland, Spain, and Italy for the four years 1906 to 1909. It has been prepared from official sources by M. Paul Roux, of the public health department of the Ministry of the Interior in France, and may prove useful to medical officers of health. It is illustrated by a chart in which the mortality from the various diseases and groups is compared in a manner very striking to the eye. England and Wales share with Belgium, Italy, and Spain an exceptionally high mortality from measles, and with Germany and Italy from pneumonia.

THE coroner, in summing up at the inquest with regard to the fire at Messrs. Barker's premises, Kensington, said that it would be interesting to know how many other buildings in London were in the same condition as the jury had been told Messrs. Barker's premises were, how the many negotiations were going on, and how many buildings were waiting before the necessary alterations were made. Mr. Edwin O. Sachs, chairman of the executive of the British Fire Prevention Committee, replies to these questions by the statement that there are upwards of 50,000 buildings in the metropolis to which the London Building Amendment Act, 1905, has not yet been applied; only 2,330 buildings had been scheduled for action down to June last, and only 1,203 had been considered by the Building Act Committee of the London County Council; of these 1,203, only 527 had at that date been satisfactorily equipped by the provision of suitable means of escape.

THE usual monthly meeting of the executive committee of the Medical Sickness, Annuity, and Life Assurance Society was held at 429, Strand, London, W.C., on November 15th, Dr. F. J. Allan in the chair. The claim account presented showed a margin in favour of the society as against the amount expected. The number of motor accidents showed a steady increase, and some had been serious, involving long periods of incapacity. No extra premium is charged to members using motor cars or motor cycles. The new proposals received were about up to the average, but the number of members desiring to insure for higher amounts had increased, and indicates that those who have had experience of the benefits derived from being insured in the society wished to be covered for the highest amount available under the rules. Under one of the present bonus schemes, should death take place before 65 the representatives of the deceased member would be entitled to an amount which increases automatically with the length of membership and the sum insured. Prospectuses and all further information can be obtained from Mr. Bertram Sutton, Secretary, Medical Sickness and Accident Society, 33, Chancery Lane, W.C.

Letters, Notes, and Answers.

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

COMMUNICATIONS respecting Editorial matters should be addressed to the Editor, 429, Strand, London, W.C.; those concerning business matters, advertisments, non-delivery of the JOURNAL, etc., should be addressed to the Office, 429, Strand, London, W.C.

MANUSCRIPTS FORWARDED TO THE OFFICE OF THIS JOURNAL CANNOT UNDER ANY CIRCUMSTANCES BE RETURNED.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C., on receipt of proof.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

CORRESPONDENTS not answered are requested to look at the Notices to Correspondents of the following week.

TELEGRAPHIC ADDRESS.—The telegraphic address of the EDITOR of the BRITISH MEDICAL JOURNAL is *Aitiology, Westrand, London.* The telegraphic address of the BRITISH MEDICAL JOURNAL is *Articulate, Westrand, London.*

TELEPHONE (National):—
2631, Gerrard, EDITOR, BRITISH MEDICAL JOURNAL.
2630, Gerrard, BRITISH MEDICAL ASSOCIATION.
2634, Gerrard, MEDICAL SECRETARY.

☞ *Queries, answers, and communications relating to subjects to which special departments of the* BRITISH MEDICAL JOURNAL *are devoted will be found under their respective headings.*

QUERIES.

N. asks for advice in the treatment of chronic urticaria in a woman, aged 24, employed in clerical work. The urticaria is of twelve months' duration. Treatment by diet, stomachics, atropine, and bromide has failed. Rest and change of air have been of temporary service.

SOMNILOQUISM.

O. C. asks for information as to the cause and treatment of talking in sleep, which, in the married state, may be very disconcerting to the partner.

DEFECTIVE EYESIGHT AFTER CONFINEMENT.

DR. J. A. WILSON (Cambuslang) writes: Within a few weeks I have seen three women, with short sight, who say their vision has become worse after confinement, the presumption being that the myopia has increased. I would be pleased to have information on this point from medical men in general practice. Of course, I do not refer to albuminuric conditions pure and simple.

MALE SERVANTS'-LICENCE DUTY.

MEDICUS has in his service a boy who performs general work in connexion with the surgery, and does a little house work in his spare time, though not engaged to do so. The licensing authorities have come down upon him for a mitigated penalty of 10s. for omitting to take out a licence for the boy.

*** Although the proceedings of the officers of the council, as described in our correspondent's letter, seem to be somewhat high-handed, it is clear, on the facts, that the licence duty has been payable, and that the best course to pursue will be to pay the mitigated penalty applied for.

INCOME TAX.

G. J. G. has supplied the surveyor of taxes with particulars of his gross receipts and expenses for the last three years. The surveyor now asks for the amount of the book debts at the end of 1910 and at the end of 1911.

*** Unless there are very exceptional circumstances in the case the surveyor's request is a distinct departure from the well-recognized practice of dealing with professional accounts on a cash basis. Our correspondent might point this out to the surveyor, and, if he persists, might communicate with the Board of Inland Revenue on the subject.

DEVONIENSIS, in an interesting letter, discusses the question of the title to an allowance for depreciation of a motor car and the alternative allowance for cost of renewal. He also remarks that his assessment has been raised by £200 without justification, and that the local surveyor of taxes will only allow one-third of his house-rent, rates, etc.

*** The question of allowance for depreciation of a motor car has been dealt with in previous issues of the JOURNAL. The Board of Inland Revenue does not admit the legal title to an allowance under this head, but does not object to an allowance for the cost of renewal when the car is replaced. With regard to the deduction to be made from profits on account of house-rent, etc., this must necessarily vary according to circumstances, but it is unusual for a less proportion than one-half to be allowed; the usual proportion is two-thirds, the maximum allowed by the Act.

ANSWERS.

REBATE OF LICENCE DUTY ON MOTOR CARS.

M.D.—As our correspondent is not in practice and only uses his car to take him from his residence to the laboratories in which work is done, the clerk to the local authority is probably right in ruling that the case is not one that comes within the provisions of the Act granting relief from licence duty. The car is at present used for purposes that are not especially incidental to the carrying on of the medical profession as distinguished from any other profession.

HAEMORRHAGE FROM THE PROSTATIC URETHRA.

DR. JAMES MACMUNN (London, E.C.) writes: In reply to "Silver," I would like to say, in a fairly extensive acquaintance of the literature of such subjects, I never read of a case of haemorrhage from the prostatic urethra after injections of silver nitrate requiring external urethrotomy. I once saw, however, in the practice of a friend, copious bleeding following injections of silver nitrate where we thought we would be forced to do external urethrotomy. The bleeding was stopped by a simple expedient I had previously used in prostatic and urethral bleeding. A well lubricated condom was pulled over a French catheter, and tied, and over both an endoscopic tube, leavingabout 2 in. of the condom and catheter at the distal end uncovered. Inflation through the catheter distended the uncovered part, and acted admirably by its pressure.

LETTERS, NOTES, ETC.

PHENOLPHTHALEIN AS A LAXATIVE.

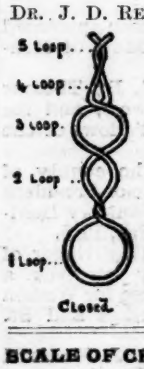
DR. J. C. MCWALTER (Dublin) writes: I think the late Dr. Thudichum was one of the first to draw the attention of the profession to the use of phenolphthalein as a tasteless laxative. It seems to be in danger of being neglected by the physician and exploited by the mere medicine vendor. I have given over 1,000 doses of it, and it is a laxative of unusual efficacy, singularly adapted to females and children. The dose is about 1½ to 5 grains, and it should not be compressed, but may be given blended with chocolate.

REFLEX STIMULATION OF THE VAGUS CENTRE IN SEASICKNESS.

LIEUTENANT-COLONEL C. W. JOHNSON (Brighton) writes: Dr. Brand suggests trying vesication of the skin over the course of the vagi nerves for seasickness. Exactly twenty years ago I tried it on two officers of the I.M.S. on our way to India, who were prostrated and would not leave their berths. Within half an hour both felt well and were on deck, and had no relapse. One of them tried it on his wife, with the same success. I put some chloroform on two bits of lint, and put one on each side of the neck (between the mastoid and the angle of the jaw), and covered the lint with silk tissue. The patients kept it on until they could not bear the smarting any longer; I think about ten or fifteen minutes. Ladies with fair skins should be informed that a red mark is apt to be left on their necks for two or three days.

A CIGARETTE HOLDER.

DR. J. D. RECKITT (Kensington) has sent us a specimen of a cigarette holder which he has devised. The holder is made of brass wire, and the directions for use are: (1) Press upon the sides of No. 2 loop, No. 5 loop opens. (2) Place the cigarette in No. 5 loop, release No. 2 loop from pressure, when the sides of No. 5 loop automatically grasp the cigarette and hold it in position. (3) The holder can be used as a rest on table, etc., with lighted end of cigarette pointing upwards. It is claimed that the holder prevents staining of fingers, is suitable for any shape of cigarette, and does not spoil cigarettes like tubes do. The illustration shows the holder closed.



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